THE GESTALT SCHOOL OF PSYCHOLOGY

and

ITS EDUCATIONAL IMPLICATIONS

by

Muhammad Saleh Jamāl

A Thesis

Submitted in Partial Fulfillment of the Requirements
for the - Degree of Master of Arts - in the
Departments of Psychology & Education
American University of Beirut

June 1951

PREFACE

Among all schools of Psychology, The Gestalt School stands as the youngest and perhaps the most promising; in other words it almost represents the latest stage of development Psychology has attained. From Central Europe, or more specifically, from Germany this school of thought has spread to the United States of America and from there to all over the civilized world. Furthermore, the effect of this school has been felt in the whole field of psychology and in the other branches of science as well. As a matter of fact, you can rarely see any book of psychology which has been recently published, without sensing in it the Gestalt spirit at least. Perhaps it is more correct to say that in recent writings the old traditional psychology has no more that respectable place it originally had. You seldom see adherents to Associationism, for instance, who do not apologize for it.

Thus the new trend of psychology is in the direction of Gestalt and away from Elementarism. Unfortunately, we are not entirely aware of this fact in this part of the world. We in the Arab Near East are still much closer to Elementarism in all our psychology, traditions, systems of education, government, economics, and our way of life in general.

In this thesis the writer is attempting to make this school of thought sympathetically and adequately known in this

part of the world which is undergoing nowadays a genuine change in its social, economic, and educational makeup. It is hoped that this thesis will contribute more or less in making this change easier and in the right direction. The writer's belief in the superiority of the holistic approach in dealing with problems may deem his work worthy of consideration by both the student of psychology and any cultured person.

The thesis is made of six chapters, the last two of which - the last one specifically - deal with educational implications. If the writer succeeds through his exposition, discussion and suggestions to arouse the interest of the intelligent reader in this subject, and to stimulate him to further investigation and follow-up, he will feel that he is well rewarded.

I wish here to express my deep acknowledgement to the departments of psychology and education at the American University of Beirut, and to all those who, through their help, made this work possible.

June 1951
Beirut

M.S. Jamāl

TABLE OF CONTENTS

AN ABSTRACT OF

THE GESTALT SCHOOL OF PSYCHOLOGY and ITS EDUCATIONAL IMPLICATIONS

BY

Muhammad Saleh Jamāl

American University of Beirut

June 1951

THE GESTALT SCHOOL OF PSYCHOLOGY
and ITS EDUCATIONAL IMPLICATIONS

In 1912 when the German psychologist Max Wertheimer published his study of the visual perception of "apparent movement", the foundation of the Gestalt school of psychology was laid. Woulfgang Kohler and Kurt Koffka the other two founders of the school served as subjects to Wertheimer's experiment. The problem they investigated was "How do we perceive motion?", "How to account for the motion we see in looking at a motion picture". Actually we do not see exactly what is projected on the screen, otherwise we would have seen a rapid series of still snapshots separated by intervals of darkness.

Wundt used to account for this motion by kinaesthetic sensations produced by the "jump" movement of the eye-balls. The eyes when moving from one position to the other created the impression of motion. There were also other explanations of this fact. One of them assumed that the motion is inferred; another is that it is due to the after-images of the first object. All these explanations collapsed before Wertheimer's criticism and demonstrations.

In order to study this problem experimentally, he simplified the "picture" and reduced the whole thing to a vertical line which could be given an apparent motion to the right or left. He exposed to view first, one line and then a similar line a little to the right or left. The two exposures were separated by a short blank

time interval. Wertheimer found that when the length of the interval was cut down to one fifteenth of a second the observer saw clearly a single line moving across from one position to the other. When the interval was longer or shorter than the appropriate span the motion was less clear or no motion at all was seen.

The fact was explained by what Wertheimer called the Phi-Phenomenon according to which the explanation of the motion should not be sought in the eyes but rather in the brain dynamism, in the "cross-circuit" or "short-circuit". Thus the motion was perceived as a whole and not as an agglomeration of sensations. And thus the primacy of the whole was established.

From this holistic point of view the whole field of psychology was revised and studied. This holistic approach has proven to be quite sound and very promising. As a matter of fact this is an application of the Field-Theory which might be considered as one outstanding characteristic of the twentieth century. The main theme of the Field-Theory is that "all measurable and observable phenomena in nature are differentiations of a preexisting organic system, whether that be a gravitational field or a human being." According to this theory all events in nature, whether physical or psychological, always occur within some field. This field has its own properties and structure which explain the localized occurence that the field embraces. The field as a whole determines the attributes as well as the behavior of the parts or parts coming within its influence and under its control.

Let us mention here that the parts are never conceived

to be passive, receiving only the influence of the whole, they also play their rôles in the whole and affect it, but always being as parts of the whole.

Thus the Field-Theory has dethroned the old Class-Theory of Aristotle which stated that "membership in a certain class determines the behavior of an object." This is no more accepted, and the psychology built upon it has lost its consideration.

It is clear to see now that Gestalt psychology began as a revolt against the traditional, Class-Theoretical psychology and it concentrated its attack against Wundt, its principal representative. Association or "Bundle-Theory" has given way to Gestalt psychology whose cardinal principle is the "wholeness". Perception according to it proceeds from the whole which is more than the sum of its constituent parts. Whenever we look around we see segregated objects (organized wholes) like books, chairs, trees, persons etc..... We do not see unrelated parts or meaningless sensations; in other words we see Gestalten(1). These "Gestalten", however, follow in their organizations definite laws, the most important among them are the following as discovered by the school of Gestalt: Law of Proximity, Similarity, Closure, Pragnanz, Membership Character, Figure and Ground, Past experience or Habit, etc..... The Gestalt school of psychology believes also in the unity of both physical and psychic worlds. They

---

(1) Gestalten is a German word the singular of which is the German term Gestalt. This term has actually no identical equivalent in English, although many translations have been presented among which are: configuration, pattern, form, shape, structure etc.....

believe also that they are both governed by the same laws which have no claim to be more physical than psychological. Raymond Holder Wheeler, the American psychologist, has formulated his eight "Organismic Laws" which he believes they govern the world. These laws which are after Kohler's conceptions originally, are: the Law of Field Property, Law of Determined Activity, of Derived Properties, of Individuation, of Field Genesis, of Least Action, of Maximum Work, and of Configuration. To these he added the Law of Transposition later on.

Thus the school, although mainly psychological it spread into the other branches of science and was proven to be fruitful everywhere it was applied. From Germany it spread to the United States of America and from there to all over the civilized world. In 1926 one of its pioneer by the name of Kurt Lewin founded what he called "Topological psychology", a new branch of Gestalt psychology. This new branch applies the notions of Topology(1) in psychological and social problems.

Before stepping in the field of educational implications let us mention that this school has good philosophical foundations. The adherents to it believe in the primacy of the whole and in the fact that the existence of the parts is always in terms of the whole. Each whole, according to them, may be a sub-whole of a larger whole and so

---

(1) Topology is a branch of geometry which deals with those properties of a figure which are unaffected by any deformation of the figure, without tearing or joining; it is a non-metrical and non-directional geometry. A circle, an ellipse, a polygon are topologically equal. And any three-dimentional figure is equal to a sphere.

on. They believe in a kind of determinism through which they see order and organization in the universe. Thus prediction and formulation of laws are possible. Finally they are monistic in their outlook. They unify, for instance, heredity and unvironment under what they call "Growth Potential". Though they give them equal credit, they are somewhat biased towards environment.

When the Gestaltists deal with learning, intelligence, insight, problem solving, memory, etc.... they make good use of the law of Closure and especially that of Pragnanz. Any problematic situation, in which the individual finds himself, creates in his mind a gap which produces tension and restlessness. This tension will remain until the gap is closed in the best way that the prevailing conditions of the field allow. They challanged Thorndike's laws of learning. Actually Kohler, through his experimentations on apes and animals, has shown the shortcomings and inadequacy of "Trials and Errors" to explain the heart of learning and problem solving. He thus introduced the concept of insight and the restructuring of the field.

All this has wide educational implications. Perhaps John Dewey and his progressive education are the best representatives of these implications, The kinship between Dewey and the Gestalt school is well seen in his famous Bible of Education called "Democracy and Education". In this book he perceives education to be a process of growth in a social environment; the function of the school is to direct and promote this growth. Among the numerous implications are: the superiority of the "whole" method over the "part" method in teaching, the use of "direct method" in teaching languages in particular. The

fact that the needs and interests of the child should be taken into full consideration is a cardinal implication. The whole personality of the child should be considered and not sides of it only. The unity of discipline and interest, subject matter and method, individual and society, mind and world, etc.... are all implications of the school.

Let us conclude by exposing some of the educational problems of the Near East (Syria particularly) in terms of Gestalten. Some of these problems are: The Student and His Home, Student and Teacher, Teaching and Syllabus, School and Community, and Equality of Opportunities. Gestalt psychology teaches us that any reform is not genuine if restricted only to one or few of these items. They all are sub-wholes of a greater one, they all are interrelated and inter-dependent. Therefore any reform has to involve all these items and many others, then we can expect the pregnant whole with all its beauty and pragnanz to emerge.

Chapter I

Field Theory

An Introduction to Gestalt Psychology

Before discussing the Gestalt theory and proceeding to its educational applications, it seems to me that a brief exposition of what is called "Field Theory" is necessary. Gestalt theory, as I see it, is nothing but a special manifestation or an appropriate aspect of the field theory. George W. Hartmann of Columbia University considers Gestalt theory as a 'variety' of the field theory which concerned itself with psychology.(1) The Basic theme of the field theory as stated by Hartmann is that: "all measurable and observable phenomena in nature are differentiations of a pre-existing Organic system, whether that be a gravitational field or a human being."(2) Thus, according to the field theory one can say that all events in nature, whether physical or psychological always occurs within some field, this field may be big or little, simple or complex, in other words it has its own properties and structure which explain the localized occurence that the field embraces. Any object in the field has no inherent properties of its own, they are all traceable to forces impinging upon the object from the surrounding field. Therefore, the field as a whole determines the attributes as well as the behavior of the part or parts coming within its influence and under its control. A word of warning should be said

---

(1) George W. Hartmann in "The Psychology of Learning" 41st year book of the National Society for the Study of Education Part II, P.173, 1942

(2) George W. Hartmann's "Gestalt Psychology" The Ronald Press Company, New York, 1935, p.72

here. The parts are never conceived to be passive, receiving all the time the influence of the whole, they, also, play their roles in the whole and affect it. Perhaps, this situation may be clearly understood if it is schematically portrayed as follows in this over simplified form:

(from the 41st year book of the national society for the Study of Education. Part II, P.166 by Hartmann)

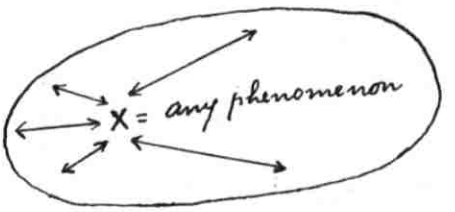


Fig. (1)

In this figure (x) represents any phenomenon in nature. The double-headed arrows indicate the interdependence or reciprocal influence between the parts and the whole itself. Actually, of course, the forces emanating from the whole, says Hartmann, are far more powerful and decisive than those coming from any of its segments.

The idea of field is becoming clearer now so that we can give many illustrations of fields; the solar system, for instance, any living organism, the classroom situation, all are illustrations of fields.

Scientific Definition

Kantor, J.R. defines the field as "consisting of a definite frame of reference marking the limits of interactions of phenomena during the occurance of events."(1) Actually the terms field, system, structure, organization, pattern, frame of reference, occur very frequently in the thinking and writing of Einstein,

---

(1) 41st year book, Part II, Hartmann, 1942, P.170

Eddington, Jeans and other eminent spokesmen of the new physics. What does this indicate ? It indicates, probably, that these conceptions are considered by these scientists to be essential differentiating factors in the world outlook they are seeking to know and describe. In fact, the present physicists of the 20th century view the natural order in terms of energies distributed in variously organized systems of masses, energies, and motions.

It is clear now that the term 'organized systems' is a field concept. And the field theorists are of the opinion that no science is possible without the field concept and the field type of approach. That is why they consider Galileo the father of the new science. He insisted that the dynamic relation of bodies in a free medium or field is the cause or condition of their falling. Hence, he thought in terms of fields. He rejected boldly the traditional view of an internal principle determining the fall of a body. This view was that of Aristotle who thought in terms of class theory rather than in terms of field theory

Field Theory Versus Class Theory

Let us see what is actually meant by 'class theory'? Let us compare the central idea of a class theory with the central idea of a field theory. Thus we shall be able to understand more, each of them and to gain a deeper insight in the field theory about which Hartmann in 1935 said: "By 1950 it may well be a major reference center and professional guide for a clever majority of folks in the academic and teaching worlds. (1)

---

(1) Hartmann - 41st year book Part II, 1942, P.165

By class theory is meant actually not a scientific explanation of a given phenomenon but rather a classificatory explanation, if it is safe to call it so. "The central idea of a class theory", says Brown, "is that membership in a certain class determines the behavior of an object," while "the central idea in a field theory is that the behavior of an object within a field is determined by field structure."(1) In a 'class' theory the explanation of any phenomenon or any kind of behavior is as follows:

1. The phenomenon or the behavior of different individuals is observed.
2. The common characteristics are abstracted.
3. Any other phenomenon or any other individual that shows these characteristics is included in the class and the phenomenon or the behavior is then regarded as explained.

In the field theory, the explanation of any event is made as follows:

1. The structure of the field is characterized in terms of laws which are logical constructs.
2. If the behavior of the object follows these laws, it is said to be explained.

A stone thrown in the air returns downward. Why ? Aristotle, the class-theorist, says it does so because it belongs to the class earth. The modern physicist who thinks in terms of field theory accounts differently for this event: "in the modern theory of the gravitational field, bodies fall in a direction and

---

(1) J.F. Brown's "Psychology and The Social Order", McGrow-Hill Book Company, inc. New York, 1936, P.480.

at a rate which is determined in final analysis by the spatial-temporal distribution of bodies in the cosmos. The important thing is the pattern, or arrangement, or Gestalt of these bodies, not the individual bodies themselves. The forces directing the fall, furthermore, show the properties of a vector. The strength and direction of these vectors are determined by the distribution of the objects in space and not within the object, so that one may say there is no local determination."(1)

Phenotypes Versus Genotypes

In fact the whole trend of modern science, in all its aspects, is away from class theory and toward field theories. Physics, however, began to make this transition at the time of Galileo, but psychology is making it to-day. If one consults the history of science development, one will make sure that there is almost a rule which implies that every branch of science has moved from a period of description and classification of facts, to a period of understanding the underlying dynamic, or of scientific explanation. The first stage is called "Phenotypes" and the second "Genotypes". The following table of comparison might make the matter clearer:

Language of Data (Phenotypic Description	Language of constructs (Genotypic Descriptions)
Example: the apple falls at an accelerated rate.	Example: the gravitational field is so structured that $S = \frac{gt^2}{2}$ (2)
The child wants candy.	There is a vector toward a goal in the psychological field. (3)

(1) J.F. Brown's "Psychology and the Social Order", McGrow-Hill Book Company, inc. New York, 1936, P.480.
(2) g = the gravitational constant, t = time S = distance.
(3) J.F. Brown, op.cit. P.34.

In a quotation made by Lewin, Brown says in this connection that "Psychologists in the past were constantly confusing the phenomenal and the conditional-genetic sides of acts. Two acts can be phenotypically quite different and genotypically identical - or the reverse. Thus an embarrassed child may exhibit its shyness in blushes and confusion, or it may become loud-voiced and assertive - the two modes of behavior are genotypical equivalents. On the other hand the play acting of emotion, and real emotion may be said to resemble each other phenotypically, although genotypically quite opposite."(1)

This discremination between the two facts is of great importance. The old psychology of "elements" over-emphasised the questions of phenotype, so that the problems of causal dynamics (genotype) were obscured. The situation is reversed now with the Gestalt psychology particularly which was the first among the other schools of psychology to recognize the superiority of the genotype over the phenotype. In fact, it is quite safe to say "the advantage of the constructive language is that many phenotypes may be understood as instances of one genotype." (2) Thus when the facts are classified and described, they must be subjected to theoretical analysis and further experiment, then science will arrive to explain and later on to predict the future facts. Such science becomes systematized.

It is, perhaps, wise to mention here that not all the physical sciences are equally systematized. Physics itself, for

---

(1) "A Source Book of Gestalt Psychology", prepared by Willis D. Ellis, with an introduction by Professor K. Koffka, the Humanities Press, New York, 1950, P.285

(2) J.F. Brown's "Psychology and the Social Order", 1936, P.34

instance, which might be thought of as the "physiology" of matter, is almost completely systematized, while chemistry is still much concerned with classification. This is to show that if the biological sciences in general and psychology and sociology particularly have not achieved yet a good deal of systematization, we as students of psychology should strive for it hoping to complete what has very recently been done in this direction through the application of field theory to psychology also. Sigmund Freud was the first individual to accomplish, in the field of psychology, a fairly complete systematic dynamic theory of human behavior. He was like Darwin, who in the field of biology, gave the first general hypothesis from which one could understand the dynamic order in the biological nature. It is quite true that neither the Darwinian nor the Freudian hypothesis are as completely systematized as are physical theories; the important thing is that they tend in the same direction. (1)

The difference between the old science and the modern is now clearer. If the simplest and earliest types of science are characterized as being 'class-theoretical'. the most complex and systematized modern sciences are 'field-theoretical'. Practically all Greek science was concerned with classification. The science of the Middle-Ages was again largely classificatory on a theological basis. The emergence of the Galilean and Newtonian mechanics marked the first time in history when any science developed on a completely systematized dynamic basis.(2) This shows very clearly

---

(1) J.F. Brown, with the collaboration of Karl Menninger "The Psychodynamics of Abnormal Behabior." McGraw-Hill Book Company inc., New York, 1940, P. 140.

(2) J.F. Brown, with the collaboration of Karl Menninger, Ibid. PP. 139-140.

the superiority of the field approach to the class approach. But this does not mean that no discoveries have been done before the adoption of the field theory. The ancient Greeks discovered the laws of that branch of mechanics which we call "statics", when they were in the classification or phenotypic period. Nevertheless, we must be sure that had they known the field approach and applied it they would have discovered much more.

Deductive and Inductive Methods Versus Hypothetico-deductive Method

On the other hand, the field theory does not emphasize the pure deductive method which is still in vogue, and which is the "process whereby one discoveries all the logically consistant implications of a given set of postulates or axioms."(1) Instead they use what they call the hypothetico-deductive method; they believe that from pure deduction one can gain only truths which are implicit in the first premises. When we say that all men are mortal, - Socrates is a man, - therefore, Socrates is mortal. The so-called conclusion is actually not a new truth, because it is implicit in the first premise "all men are mortal". Although this method has proven itself to be useful in mathematical sciences one should remember always that unless the original postulates, from which the deductions are made, are meaningful, this method fails short to give any truth. In the hypothetico-deductive method says Brown, one constantly increases the breath and validity of the first postulates.

---

(1) J.F. Brown, "Psychology and the Social Order", 1936, P.31.

Almost the same criticism holds true in the case of the inductive method. Logical induction is usually defined as "the process of establishing a generalization by showing that it applies to every instance which is said to include." Thus all men are mortal, the initial proposition of the standard syllogism is a generalization gaind by induction. This method was considered, until the nineteenth century, to be the technique of especially the natural sciences as opposed to mathematics.

More recent methodological studies, says Brown, have shown that the important scientific discoveries are never made by pure induction.(1) He challenged the nineteenth century method, e.g., induction, by the contrast he made between the inductive method and the hypothetico-deductive method which he advocates. To make this contrast he gives the steps which were supposedly taken by both methods.

The nineteenth century, says Brown, considered the scientific process to be simple induction, that is:
1. observation 2. measurement 3. finding laws and building theories. But he adds that modern research into methodology has indicated that this assumption is inadequate, the process is much more complex than this; "what

> 'what really happens in the scientific process," says Brown, "is roughly the following: uncontrolled observation gives the investigator some sort of 'hunch' as to what the possible law relating two variables may be. He states this law in terms of a functional equation which becomes a working hypothesis. In the experimental situation, where the hypothesis is tested, the validity of the law is assured and a device is found which allows the reduction of qualities in nature to fundamental measurement."(2)

---

(1) J.F. Brown, op.cit. P.31

(2) Ibid. P.471.

Thus according to Brown, it is increasingly likely - as he puts it - that theory comes before the law in the form of "a hunch". R.H. Wheeler also holds a similar point of view. He believes that the scientific method is much more than the sheer accumulation of facts by means of observation. Nor is scientific procedure merely a process of drawing general conclusions from great many particular cases. Before Galileo and Newton discovered the law of gravity and the fall of bodies thousands of people had seen apples and thousands of other objects fall from various hights to earth; but all those observers failed to get the insight which Galileo and Newton got. Why ? Because observation alone is nothing and it remains so until it couples with it what Wheeler calls insight. Galileo and Newton, says Wheeler, "observed with insight. This insight", adds he, "was not generated by repeating their observation. It came as a creative flash, perhaps while observing, perhaps while thinking about what they had seen."(1) Thus this "creative flash" of Wheeler and the "hunch" of Brown are primarily responsible for any discovery, and the rôle of observation and measurement comes afterwards as a test.

What now are the steps one follows in the hypothetico-deductive method or the actual scientific method ? These steps, according to Brown are:

(1) "one gets a hunch about nature",

(2) "This hunch is formulated into a working hypothesis (i.e., law)",

(3) "The law is verified in an experiment;"

---

(1) Raymond Holder Wheeler, "The Science of Psychology", 2nd Edition, Thomas Y. Crowell Company, 1940, P.11.

(4) "It is then possible to repeat in a variety of situations the experiment which uncovered the law (i.e., one can make measurement)."[1] Thus, just from the beginning while making casual observations the scientist gets a "hunch", an "insight", or a "creative flash" through which he comprehends the law or principle underlying the phenomenon in question. Now, this law or principle needs to be verified and tested; to do so the scientist uses this law or principle itself to plan an experiment, devise apparatus, or to control observation systematically. Then the law is modified, refined, or corrected if necessary, and is finally stated in quantitative language if possible.

This modern view point, we should mention, is not confined to field theorists only. Clark L. Hull who is strictly bahaviorist adopts also this hypothetical-deductive apprach.[2] E. Terry Prothro and P.T. Teska also held a similar view point, they say with John Dewey that in scientific investigation we do not begin by observation but rather observation comes later on to demonstrate or verify the problem or rather the hypothesis in mind. They list five steps through which the scientific investigator usually passes. These steps are:[3]

1. Isolation of a problem
2. Setting up a hypothesis
3. Systematic observation under controlled conditions
4. Making logical inferences from the data of observation

---

(1) J.F. Brown, op.cit. P.32

(2) Ernest R. Hilgard "Theories of Learning", Appleton-century-Crofts, inc. New York, 1948, P.95

(3) E. Terry Prothro & P.T. Teska "Psychology", Ginn and Company, New York, 1950, PP. 44-46.

5. Organizing inferences into a generalization or law.

To begin with a "hunch" or a "hypothesis" and not by mere observation or fact has been pointed out long ago. Here is T.H. Huxley saying: "Those who refuse to go beyond fact rarely get as far as fact... Almost every great step (in the history of science) has been made by the 'anticipation of nature', that is by the invention of hypotheses which though verifiable, often had very little foundation to start with."(1) Thus the scientist, anticipates nature by formulating hypothses to be either supported or rejected by experiment and observation. In this connection Charles Darwin said:"How odd it is that anyone should not see that all observation must be for or against some view, if it is to be of any service."(2)

Therefore, although scientific method involves both deduction and induction, it is neither one alone. This fact, the field theory was among the firsts to recognize. Thus it differs from the class-theory which is not experimental but merely observational and emperical. When applied to the various branches of science, at the beginning of the twentieth century, the field theory led, and will undoubtedly lead to very important discoveries. A decade later, when applied particularly to psychology, it gave very promising results and consequently, directed this young science in the scientific road. In other words, field theory liberated psychology, once for all, from the domination of class-theory. Practically,

---

(1) Morris R. Cohen & Ernest Nagel, "An Introduction to Logic and Scientific Method", Harcourt, Brace & Company, New York, 1934, P.197

(2) Ibid.

instinct, soul, group mind, personality types, intuition, élan vital, human nature and so many other unscientific but rather metaphysical concepts are the products of class-theory. How ? Failing to account scientifically for many psychological phenomena the class theory was compelled to create such complicated postulates and assumptions to meet the insistent curiosity of the human mind to understand.

Now, to have a better perspective of this differentiation between the two theories, it seems wise to conclude by the illustration given by Brown for the distinction between the class-theoretical and the field-theoretical modes of explanation. Brown takes Aristotle's treatment of kinetics considering it as purely class-theoretical, and compares it with the modern physical theory considering it as purely field theoretical. In the formulation of these criteria to distinguish between the two theories, Brown declares that he drew heavily on the paper of Lewin "The Conflict Between Aristotelian and Galilean modes of Thought in Contemporary Psychology and Biology", and that Lewin was indebted in this to the German philosopher Ernest Cassirer of Hambourg, as Lewin himself acknowledges.

Criteria For Class Theory (1)	Criteria For Field Theory
1. "The behavior of objects is determined by the 'class' to which they belong".	1. "The behavior of objects is determined by the structure of the 'field' of which they are a part."

---

(1) J.F. Brown, op.cit., PP. 35 - 41.

Example: Many kinds of prejudices and social phenomena, and in general, social and national social psychology are illustrations of class-theoretical appreach. Such and such people or group or seet are cruel, (x) belongs to them; therefore (x) is cruel. Field theory rejects such appreach and deduces each one's behavior from the underlying field structure.

2."The Force directing behavior shows the properties of an entelechy."(2)

2. "The force directing behavior shows the properties of a vector."

Example: Aristotle's account for the movement of bodies, is that each body harbors an 'entelechy' which strives to return the body to its 'rightful' place. In modern physics the movement is defined by a vector whose direction and magnitude at any place are both determined by field structure.

3. "There is local determination".

3. There is no local determination."

Example: The class-theory says that the stone returns to the earth because of the 'entelechy' the stone itself harbors; its movement is locally determined within itself. On the other hand the field-theory says that the forces which originate through the field structure are the cause of the stone return.

---

(1) J.F. Brown, op.cit., PP. 35 - 41.

(2) "Entelechy": "In Aristotle's use: the realization or complete expression of some function; the condition in which a potentiality has become an actuality." "... the soul is the first entelechy of a natural organical body, having life potential." From The Oxford Dictionary.

4. "The concepts used in class-theory are primarily substantial."	4. "The concepts used in field-theory are primarily functional."

Example: The substance of which the object is made is the concern of class-theory, while the substance is of no importance in the field-theory.

5. "The method of scientific analysis is primarily structural."	5. "The method of scientific analysis is primarily functional (relational)."

Example: This is obvious from the previous item No. 4

6. "The analysis is in term of historically and geographycally conditioned regularities."	6. The analysis is in terms of ahistorical-typical laws."

Example: Every where and always Aristotle saw the bodies fall to the earth; his conclusion was, they will always do so when subjected to the same conditions. This regularity according to him is conditioned by the past, while the past has nothing to do with the fall of bodies, in the field theory.

Actually this point of denying the direct effect of the past on behavior was one of the points which have been strongly criticized and perhaps often misinterpreted. Ivan D. London, however, was among those who criticized this point and attacked Gestalt psychologists and particularly Lewin because they adopt it. Actually Lewin said:

> It has been accepted by most psychologists that the teleological derivation of behavior from the future is not permissible. Field theory insists that the derivation of behavior from the past is not less methaphysical, because past events do not exist now and therefore cannot have effect now. The effect of the past on behavior can be only an indirect one; the past of psychological field is one of the 'origins' of the present

> field and this in turn affects behavior. To link behavior with a past field therefore presupposes that one knows sufficiently how the past event has changed the field at that time and whether or not in the meantime other events have modified the field again. Field theory is interested in historical or developmental problems, but it demands a much sharper analytical treatment of these problems that is customary, particularly in the theory of associationism."(1)

London was not satisfied with this and described this idea as "misleading". When dealing with "CAUSATION ACCORDING TO LEWIN" London said: "Lewin, abjuring 'historical causation,'(2) strives to make his 'systematic-causative'(3) laws free of specific dates. In this attempt he concurs with good physical usage. But this does not render laws ahistorical in the sense that the past has nothing to do with their application. For example, a certain equation in physics may be free of specific dates, but it will contain instead a number of arbitrary constants. Although implicitly the equation may supply a complete picture of a given situation at a given time, actually it can do so only if the values of the constants are first determined. This can be done only by reference to past situations. For instance, the equation, $x = 1/2\ gt^2$, where g = the gravitational constant, has a temporal application that is general. However, before the equation may be used, the value of g must first be determined for the particular locality, as g varies over the face

---

(1) "The Fourty-First Yearbook - Part II - The Psychology of Learning", 1942, PP.218 - 219. For further details see K. Lewin, "The Conceptual Representation and Measurement of Psychological Forces". Duke University Series. Contributions to Psychological Theory. 1938, Vol.I, No.4 PP. 247.

(2) e.g., "why does a given state A have a state B and no other as a result ?"

(3) e.g., "why does just such a state come into being ?"

of the earth. It would be wrong to say of this equation in practice that it is ahistorical, for only by reference to the past situation (that is to say, to a past experiment) may the constant g be evaluated for the particular locality in question."[1] I wonder here whether Lewin is really denying definitly the role of the past in shaping the present. I think that he is aware of this fact and he believes that "the past of psychological field is one of the 'origins' of the present field". Lewin said that the past "In turn affects behavior" but its effect "can be only an indirect one". I rather tend to believe that Lewin's insistence on the present field situation has been misinterpreted; the past is indirectly included in the present, because the process is a continuous one, e.g. a "continuum". His emphasis on the present situation, I believe, is to make psychology free from teleology and other metaphysical concepts, e.g. to make it scientific. The mere occurence and reoccurence of an event in the past does not justify our conclusion that it must occur in the future just the same way it occured. The occurence of any event, Lewin believes is determined by the present field as it has become now and is never determined by the past only, otherwise, the present would have no existence and no effect. In this connection, Krech and Crutchfield say that "a comprehensive explanation of the 'causation' of the individual's behavior will of course, require a consideration of both the immediate dynamic and the genetic problems; but for most efficient analysis and to avoid

---

(1) Ivan D. London "Psychologists' Misuse of the Auxiliary Concepts of Physics and Mathematics." Reprinted from Psychological Review, Vol. 51, No.5, September, 1944, P.271.

conceptual confusion, the two should be kept separated."[1] Thus when Lewin emphasizes the immediate psychological field he wants to call the attention to the nature of the situation at that moment and to its dynamics, otherwise we risk to explain phenomena always through the past on the expense of the present.[2]

> "Immediate psychological field," say Krech and Crutchfield, "...can be thought of as a cross section, at a given moment of the psychological existence of the individual. It includes only what is present at the moment, not what was present previously or what may be present in the future. In considering the whole developmental history of the individual, of course, what exists in the immediate present is merely an extension of what existed a moment before and is itself the immediate antecedent of what will exist a moment later. But we are not here concerned with the whole causal chain of events which gives rise to the individual's psychological existence at any moment; we are interested in the nature of the situation at that moment and in its dynamics."(3)

7. "The method is primarily emperical."	7. "The method is hypothetico-deductive."

Example: Aristotle contented himself by experiences without control or verification through the experimental method; where as Galileo, the field-theorist, subjected his hunch or hypothesis to experimental control and verification.

8. "The analysis allows dichotomies."	8. "The analysis allows no dichotomies."

Example: According to Aristotle only in the sphere of the ether the absolutly regular laws can be found; while in the theory of

---

(1) David Krech & Richard S. Crutchfield, "Theory & Problems of Social Psychology", McGrow-Hill Book Company, inc. New York, 1948, p.34.

(2) This is similar to the criticizm of Gestalt psychology, presented by "Piaget" who said that Gestaltists deny the influence of past experience in solving the present problems. We shall take up this problem in (Chap. III), however we can say now that Gestaltists do not deny the effect of past experience but they do not also emphasize it too much. On the other hand we shall see that one of Wertheimer's laws is called "law of habit or familiarity." See p.(94) Chap.III

(3) David Krech & Richard S.Crutchfield, op.cit. P.33

gravitational field there is no essential difference between events on earth or on the moon.

In psychology also such dichotomies abound: intelligence and instinct, 'normal' individual behavior and 'abnormal' mob behavior. This is not the fact according to the field psychology; there is no strict dichotomy between instinct and intelligence nor between the individual when alone or when in mobs.

9. "Class theory tends to use valuative concepts."	9. "Field Theory insists on non-valuative concepts."

Example: According to Aristotle, movements in the ether were 'higher' and perfect while movements on the earth were 'imperfect'. Social psychology was mostly written from the standpoint of a certain social class or political party or even religious belief.

10. "Class theory attempts to answer a metaphysical "why" ?"	10."Field theory attempts to answer a scientific 'how' ?"

Example: Science never explains why nature is the way it is, but simply relates certain events to others in terms of logical necessity. Galileo attempted to answer the modest question "How do bodies move ?" while Aristotle's question was: "Why do bodies move?".

Field Theory and the Use of Mathematical Constructs

Field theory makes a large use of mathematics. No wonder for that, because field-theory is "typically physical, and especially electromagnetic in nature."(1) It is obvious, however, that physics is the branch of science which makes use of mathematics more than any other branch. It is known also that mathema-

---

(1) George W. Hartmann, "The Psychology of Learning", 41st Year book of the National Society for the Study of Education, Part II, P.173, 1942.

tics is used in science both in making statements about the phenomena under observation (measurement), and also in the building of theories and laws. So, mathematics may fairly be called the language of science. Not only this; but Kant goes furthermore to say that a discipline is as scientific as it contains mathematics. "Probably", says Brown, "the chief characteristic of modern physical science is its use of constructed mathematical theories."(1) Now, what are some of these theoretical constructions ? They are like the force of gravity, the kinetic theory of heat, the electromagnetic field and many other devices which have been invented by the physicists in order to correlate and systematize the various facts they have observed. We should keep in mind that it is not necessary for these constructs to be directly tangible; no one, for instance, has ever seen the force of gravity but through this postulate mainly many problems of mechanics are explained and coordinated. The same thing is true with the electromagnetic field; with this postulate we are able to understand the various deflections we observe in the magnetic needles, although the electromagnetic field itself is not directly observable.

All this is to say that whenever our approach is field-theoretical we have to use constructs very similar to the mathematical ones if they are not pure mathematical in flesh and blood. Since "all dynamical theory tends to be field-theory,"(2) so mathematics is being used more and more. But what about psychology which is becoming more and more field-theoretical ? does it make

---

(1) J.F. Brown, with the collaboration of Karl Menninger, "The Psychodynamic of Abnormal Behavior", McGraw-Hill Book Company inc. New York, 1940, P.140

(2) J.F. Brown, "Psychology & the Social Order", McGraw Hill Book Company inc., New York, 1936, P.480.

use of mathematics and to what extent ? And perhaps the more meaningful question would be, is it good for psychology as a biological science to use mathematics both in measurement and in theory building ? Practically psychology, like many other biological sciences, uses mathematics in measurement; statistics and statistical procedures have been used long ago in testing psychological traits, in test construction, in prediction, in factor analysis, and even in the process of tests validation; this has become a recognized fact in psychological field. As to the other part of the question, namely the use of mathematics in theory building, the disagreement among philosophers and psychologists is greater and the gap is larger. Many philosophers do not admit, even the possibility of using mathematics in any biological science and particularly in psychology. Psychological phenomena, they say, are very particular, and very personal; psychological activities are extremely complex, and psychological problems are always of a genetic nature; therefore they cannot be controlled and reduced to simple mathematical formulas and laws. Many psychologists also share this conviction although not to the same extent, they do not deny the possibility of using mathematics for ever, but they argue, that it is not the right moment now for the extensive use of mathematics because psychology is still a young science, about which our knowledge is very limited and tentative, so they prefer, in this stage of development, that psychology satisfy itself, if necessary, with the use of mathematics in tests and measurements and not in theory building.

On the other hand, there are people, like Lewin and Brown, the Gestaltists, and Clark L. Hull the behaviorist, who are

convinced that unless psychology uses mathematics extensively, as the other branches of science do, it will never reach the level of a "science". In fact, the psychologists who used mathematical procedures in theory building were many. Among them, we can mention Spearman and Thurstone particularly, because they are well known in their use of what is called, "factor analysis". By using this mathematical means they aimed to know what the nature of intelligence might be; is it mainly a (G) factor or a (group factor) concept ? Although no decisive result have been obtained, yet their conclusions and suggestions deserve most careful consideration.

Among living psychologists, perhaps Hull, has made the most extensive use of mathematics in psychology. Consequently his works have been very difficult to be understood even by psychologists. Hull was greatly impressed by Pavlov's works, and particularly by his book "Conditioned Reflekes" which was translated into English and published in 1927. He followed this line of study in his theoretical and experimental work. Hilgard says that

> Hull's theory is strictly a behaviorism, avowedly mechanistic and studiously avoiding reference to consciousness; its central concept is habit, and it derives most of its information about habit from conditioned responses; complex learning is derived step by step from what is known about more elementary forms of learning.... Something like Thorndike's law of effect lies at the very heart of Hull's system while Watson (the pioneer of behaviorism) rejected the law of effect.(1)

The "habit" being the central concept of his system, Hull formulated equations to compute what he calls "habit strengh" the symbol of which is sH_R , and which is something roughly like

---

(1) Ernest R. Hilgard "Theories of Learning", Appleton-Century-Crofts, Inc. New York, 1948, P.76.

the stimulus-response relationship. He found also a relationship between the habit strength and the amplitude (A) of galvanometer deflection in millimeters; that is for every value of (A) in millimeters it is possible to assign a value of sH_R in habs (see its coming explanation).

Hull assumes that the rate of habit growth depends upon three factors or "parameters" as he calls them:

1. "The physiological limit or maximum (M)."
2. "The ordinal number (N) of the reinforcement producing a given increment to the habit strength (ΔsH_R)".(1)
3. "The constant factor (F) according to which a portion (ΔsH_R) of the unrealized potentiality is transferred to actual habit strength at a given reinforcement."(2)

There is, therefore, a relationship between the habit strength and the number of reinforcements. "The assumption in that case", says Hull, "was that habit strength is directly proportional to the number of reinforcemtns up to the physiological limit."(3) But to measure this habit strength Hull needed a unit; so he devised what he called "hab". "This is taken arbitrarily as 1 percent of the physiological maximum (M) of habit strength attainable by a standard organism under optimal conditions.... Thus ... there would be 100 habit units, or habs, between zero and the physiological limit, i.e., one hab = $\frac{M}{100}$" (4)

---

(1) Δ = increment, e.g., , , $\cdot$ = a sign used in mathematical logic meaning "and". For further details see: Clerk L. Hull Principles of Behavior", Appleton-Century-Crofts, inc., New York, 1943, P.408

(2) Hull, op.cit., P.408

(3) Clark L. Hull, op.cit., P.119

(4) Ibid., P.114

To make the matter clearer we can mention the following example given by Hull himself. Suppose, he says, that the growth constant (F) in a given reinforcement situation is taken as 1/10. The possibility of learning or the physiological maximum (M) being (100), therefore one-tenth of (M) is 1/10 x 100 = 10 habs. Now, in one reinforcement the increment was 10 habs, the number of habs left is, therefore, 100 - 10 = 90 units of growth yet possible of realization. Consequently, in the second reinforcement, the habit increment (F being always 1/10, constant) must be 1/10 x 90 = 9 habs. In other words, the second $\Delta \dot{s}H_R$ = 9 habs. Subtracting 9 from 90, we have left 81 units of possible growth. Similarly, 1/10 x 81 = 8.1 habs will be the increment in the third reinforcement or $\Delta \dot{s}H_R$ = 8.1, and so on. This process, says Hull can be repeated as many times as there are successive repetitions of the reinforcement. Hull computed many more increments and noticed that these increments become smaller and smaller until, with very large values of N, they become unfinitesimal, as he puts it. The following figure (1) shows the diagrammatical representation of a theoretical simple positive growth function. At the left are given the successive increments of habit accretion for successive reinforcements. At the right may be seen the amount of accumulated

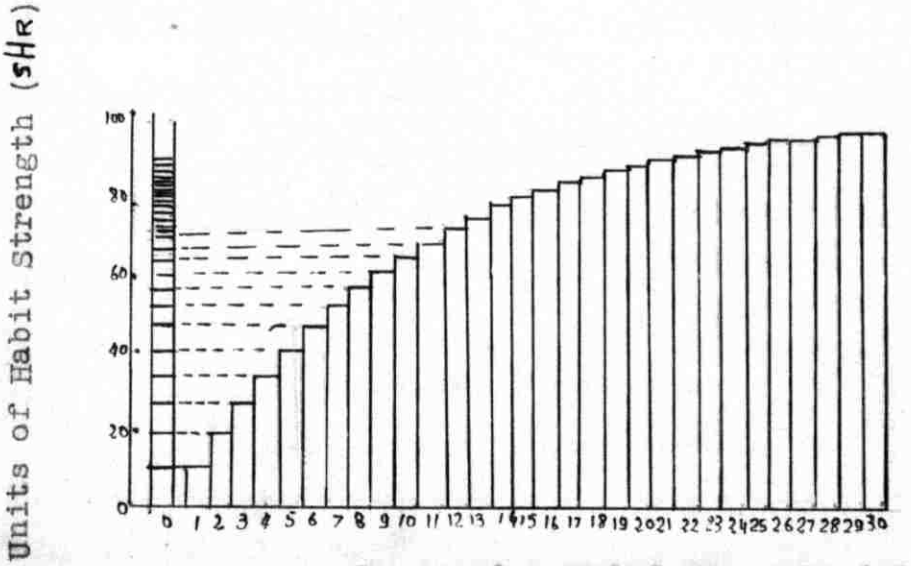


Fig. II

(1) This figure is adapted from Hull, op.cit., P.116, Fig.25

habit strength at the successive reinforcements (N = 30). The contour of this columnar figure is a rather precise representation of what is here conceived to be the basic "curve of learning" from which, says Hull, all other theoretical curves of learning are derived in one way or another. Hull noticed that the rise of this curve was comparatively rapid, then the rate of rise gradually diminishes until at high value of (N) it becomes practically horizontal. This type of the curve is called "negatively accelerated" because of its progressively diminishing rate of rise.

Before finishing with Hull, let us, for the sake of illustration, give only one of his equations: Here is the equation according to which the habit strength is computed:

$$s^N H_R = M - M e^{-iN} \qquad (1)$$

where M = 100, N = the number of reinforcement repetitions,

$e^{(1)} = 10$ and $i = \log \frac{1}{1-F}$ (2)

where F is the reduction constant, in the above example as 1/10, i.e., F = 0.1. Accordingly:

$$i = \log \frac{1}{1-0.1} = \log \frac{1}{0.9} = \log 1.111111^{+}$$

Now, by ordinary logarithm tables,

$$\log 1.111111^{+} = 0.04574 \text{ (Approximately).}$$

therefore, if we wish to determine the amount of ($s H_R$) after five reinforcements, says Hull, we have:

$$s^5 H_R = 100 - \frac{100}{10^{.04574 \times 5}}$$

---

(1) e = a mathematical constant properly having a value of 2.7183 but here frequently given the value of 10 because more convenient in use where logarithms are involved. From Hull, op.cit. P. 403.

$$= 100 - \frac{100}{10^{.2287}}$$

$$= 100 - \frac{100}{1.6952}$$

$$= 100 - 59.0597$$

$$= 40.94$$

Thus after 5 reinforcements the amount of habit strength will be in these conditions 40.94 habs.(1)

This is only to show that Hull also was one of those who wanted psychology to be a predictive science, through the extensive use of mathematics. This is not an easy enterprise, of course, But I tend to believe that this is a good attitude and a promissing movement. No doubt, that this movement will make psychology, more difficult perhaps, especially at the beginning, but later on it will help more to make psychology as precise and easily understandable as any other science. The book entitled "Mathematico-deductive theory of rote learning" which was written in 1940 by Hull and his collaborators was "the most difficult ever written by psychologists."(2) While the later volume, "Principles of Bahavior" (1943) to which we have made many references, could be easier and more understandable.

It is time now to go back to our main question and answer it: "In this controversy, of using and not using mathematics, where does field-theoretical psychology stand ? The field-theoretical psychology admits that psychology is still a young science, that psychological problems are complex and are always of a genetic

---

(1) Hull, op.cit., PP. 114 - 120

(2) Ernest R. Hilgard, "Theories of Learning", 1948, P.96.

nature, but, says Brown, "none of these stock arguments are finally of methodological validity.... mathematics is as important for theories as it is for measurement. Psychology, like any science" adds Brown, "will advance rapidly as theory and experiment become integrated."(1) So he does not agree with those who do not justify the use of mathematics until more knowledge in psychology is gained. He reverses the issue and proceeds in the opposite direction. He believes, just like Hull does, that psychology will not advance and no adequate knowledge in psychology will be gained if we do not use mathematical methods both in psychometry and in theory building. According to Brown, "the chief difficulty with the past attempts at psychometrics was that such theories as were used for psychometrical devices were without a mathematical foundation consistent with psychological reality"(2) Here Brown points out to what I consider a very meaningful side of the problem. Mere mathematics would be of no use, according to him, but that mathematics which is "consistent with psychological reality" is the kind of mathematics he advocates. Not mathematics as such but mathematical methodology should find a recognized place in the field of psychology. Brown goes a little bit further and says that it is because of "the lack of an adequate mathematical methodology with which to phrase psychological theories",(3) psychologists have so far not had the "hunches" necessary to formulate working hypotheses which might end to become laws.

---

(1) J.F. Brown, op.cit., P.472

(2) Ibid.

(3) Ibid.

Thus we can see now that the field-theoretical psychology admits the use of mathematical methodology to a large extent, provided they are "consistent with psychological reality"; psychological realities come first; they should be the premises from which to infer, mathematically, when possible, new ideas, new theories and ultimately new laws. This is a field-theoretical concept about which Brown writes: "I believe, however, that if there is to be theory building at the present time in psychology, field theory is the only possible theory on the basis of the known experimental evidence."(1) It seems to many that Brown is right when he expresses his faith in the field-theory. Practically, through the field-theoretical approach modern physics achieved its "greatest triumph" in the development of dynamics.(2) Therefore the logic of facts appears to them to be, that since all psychological behavior involves problems of dynamics, the field-theoretical approach is the appropriate one in psychology also. Wheeler, likewise, holds the same point of view on a larger scale. He believes that there are "legitimate principles" which can and must be applied to the various areas of science including psychology, if psychology is ever to become a science. Wheeler says:

> It is believed, that if psychology is ever to become a predictive science and an ordered body of knowledge at the same time, legitimate principles which transpose from one area in the science to another must be used and that

---

(1) J.F. Brown, op.cit., P.501

(2) "Dynamics may be defined as the science of systems undergoing change...opposed to dynamics is statics, which investigates systems in equilibrium." From J.F. Brown, op.cit. P.477 "Psychologically speaking, an organism ceases to be dynamic only at death". ibid. P.478.

> these will be the same principles which integrate the human organism with its environment. (1)

On the basis of modern works the conclusion seems to be warrented that the future of psychological discoveries is, more or less, related to the recognition and application of such concepts. This is not easy, of course, but this kind of approach, seems to be promising. "We are", says Wheeler, "in a period, now, comparable to the seventeenth century in which the foundations of physics and biology were laid down. We are living through a scientific Renaissance quite universal in its nature, one in which psychology and social science are forming."(2) Perhaps the chief discovery of modern psychological research has come through the application of field concepts; this discovery is according to Brown "the importance of Gestalten through the whole field of behavior." (3) But what is meant by Gestalten and a fairly detailed knowledge about them will be found in the following chapters.

---

(1) Raymond Holder Wheeler, "The Science of Psychology", 2nd edition, Thomas Y. Crowell Company, 1940, New York, Preface P. VIII.

(2) Ibid., P.2

(3) J.F. Brown, op.cit., P.472.

CHAPTER II

Gestalt Psychology

Definition of the Term: the word Gestalt is a German word which has no identical equivalent in English. However, several translations have been suggested; among them are the words: "form", "shape" and "configuration", but none of these translations has been accepted with unanimous approval. "Shape," says Heidbreder, "has been criticized as suggesting too limited a field, the visual. Configuration, has been used but very warily, perhaps because its derivation suggests, though rather remotely, a composition of elements that is the very antithesis of the Gestalt. Form is evidently the least objectionable, and is coming into fairly general use; but in doing so it is taking on new connotations derived from the German Gestalt."(1) This difficulty of translation has led many psychologists to keep the original German term in their own languages, so the term Gestalt has become part of international nomanclature, and it has been used unaltered in most languages. Kohler,(2) however, one of the founders of the Gestalt school of psychology defines the word Gestalt as follows:

> In the Gernman language however - at least since the time of Goethe, and especially in his own papers on natural science -

---

(1) Edna Heidbreder, "Seven Psychologies", D. Appleton - Century Company Incorporated, New York, 1933, p. 332.

(2) Dr. Wolfgang Kohler, "Gestalt Psychology", Horace live right, 1929, New York, p. 192.

> the noun "Gestalt" has two meanings: besides the connotation of "shape" or "form" as a property of things, it has the meaning of a concrete individual and characteristic entity, existing as something detached and having a shape or form as one of its attributes. Following this tradition, in Gestalt theorie the word "Gestalt" means any segregated whole.

So in the first sense, namely as a property of things, the term Gestalt is used to denote squareness or triangularity of alternatively a square or a triangle; it is used also to denote the distinctive spatial appearance of concrete objects such as books, pencils, chairs. The term also refers to qualities expressed by such adjectives as symmetrical, graceful, awkward etc...

In the second sense as applied to the entity that has form, the term Gestalt refers to square and triangle as opposed to squareness and triangularity, to books and pencils as opposed to the characteristic forms of these objects. Kohler, however, seems to preach this meaning of the term denoting any segregated and circumscribed whole. The term Gestalt, as we shall see later, is a dynamical concept, that is why Kohler objects to the term configuration which is most often used as an equivalent term; Configuration, says Kohler, does not hold this dynamic concept. The term Gestalt, however, is not limited to the visual field, or even to the sensory field. Thinking, learning, acting have all been treated as Gestalten, and the term has found its way through the whole field of psychology and even beyond psychology. Kohler sees Gestalten in biological processes like ontogenesis, and he considers the polarization of an electrode as a good illustration of Gestalt in the domain of physics. In an article dealing with "physical Gestalten", Kohler says: "when spacial, visual, auditory and intellectual processes are such as to display properties other than

could be derived from the parts in summation, they may be regarded as unities illustrating what we mean by the word 'Gestalten'."[1] The term Gestalt, however, is not limited to this. Kurt Koffka, another founder of the Gestalt school,[2] defines the term Gestalt as follows:

> The term Gestalt is a short name for a category of thought comparable to other general categories like substance, causality, function. But Gestalt may be considered more than simply an addition to preexisting conceptual principles, its generality is so great that one may ask whether causality itself does not fall legitimately under it.(3)

This comprehensive definition is in accordance with that of Kohler when he defines, somewhere else, Gestalt theory as "a way of thinking" as we shall see very soon. Thus one might surmise from the preceding remarks, that the Gestalt theory is not only a school of psychology, but it is more than that; it is a philosophical system as well.

So much for the meaning of the term Gestalt. It is to be hoped that the further we proceed in the exposition and discussion of Gestalt theory, the clearer and the more integrated that meaning will become. This paper, however, will concentrate, upon the Gestalt theory in its applications to psychology.

Gestalt Theory: "The name 'Gestalt Theory'," says Kohler, "denotes a way of thinking which seems to be of productive signifi-

---

(1) "A Source Book of Gestalt Psychology", Prepared by Willis D. Ellis, with an introduction by K. Koffka, The Humanities Press, New York, 1950, P.17

(2) See page (36)

(3) K. Koffka, in the "Encyclopaedia of the Social Sciences", Vol. VI, The Macmillan Company, New York, 1931, P.642.

cance for the problems of various sciences".[1] So, although Gestalt theory is mainly psychological, it is not limited to psychology alone, but rather it includes the "various sciences."[1] We already saw in the first chapter how this "way of thinking" differs from the Aristotlean way; the one is field theoretical and the other is class theoretical. Here is what Kohler considers as the most general concept of 'Gestalt theory': "Whenever a process dynamically distributes and regulates itself, determined by the actual situation in a whole field, this process is said to follow principles of 'Gestalt theorie'."[2] This also reminds us of the fact that Gestalt theory which is a field theory does not believe in what is called "local determination". It is the whole field which determines the activity and gives the properties of the parts, as we shall see when discussing the eight organismic laws of Wheeler (Chap. III). Consequently the consideration of local points or local factors as such will not give us full insight into the nature of the whole. Here is the fundamentals formula of Gestalt theory as expressed by Wertheiner, the principal founder of the Gestalt school: "there are wholes, the behavior of which is not determined by that of their individual elements, but where the part-processes are themselves determined by the intrinsic nature of the whole. It is the aim of Gestalt theory to determine the nature of such wholes."[3]

---

(1) Willis D. Ellis, "A Source Book of Gestalt Psychology", 1950 P.55.

(2) Dr. Wolfgang Kohler, "Gestalt Psychology", 1929, P.193.

(3) Willis D. Ellis, "A Source Book of Gestalt Psychology", The Humanities Press, New York, 1950, P.2.

This might be considered as repetition of what we said in the first chapter and somewhere else in this chapter; this is true and it is done purposely and will be repeated again because this idea is really the corner stone of the Gestalt theory. The last sentence of Wertheimer's expression shows clearly that Gestalt theory has to do with concrete research; "it is not only an outcome but a device, not only a theory about result but a means toward further discoveries."(1) "We must," says Wertheimer, "set ourselves to penetrate to that which is really given by nature."(2) This is very interesting. Gestalt theory is an "outcome" and is also a "means for further discoveries". The present problems are insistant and other theories show themselves unable to find satisfactory solutions; so, Gestalt theory was the "outcome" of such a pressure. The fundamental problems of the time must be attacked in a new way, the way of Gestalt, which is a "means" to solve more problems. This new theory, therefore, evolved as an implication of the scientific situation and did not evolved independently. In this connection Wertheimer, in 1925, said: "Gestalt theory is not something suddenly and unexpectedly dropped upon us from above; it is, rather, a palpable convergence of problems ranging throughout the sciences and the various philosophic standpoints of modern times."(3) Here does really lie the importance of the Gestalt theory.

So far we have been discussing the Gestalt theory in general; let us now turn to Gestalt psychology, which is the applica-

---

(1) Willis D. Ellis, op.cit., P.3

(2) Ibid., P.3

(3) Ibid., P.3

tion of Gestalt theory in the field of psychology,[1] and trace its development.

Gestalt Psychology: Is the name of a school of psychology which is German by origin. Among the different schools of psychology such as associationism, structuralism, functionalism, purposivism, psychoanalysis and bahaviorism, the Gestalty school of psychology may be considered as the youngest one; it goes back to 1910. Gestalt psychology and bahaviorism, however, appeared at almost the same time, the former in Germany and the latter in America under the leadership of a young psychologist by the name of John B. Watson. The pioneers of Gestalt, school of Psychology were Max Wertheimer, Kurt Koffka, and Wolfgang Kohler, among whom Wertheimer was the most outstanding figure. Let us see now, who were those pioneers:

1. Max Wertheimer (1880 - 1943): He was born in Prague and in this city he began his psychological career with "Martius". Then he came to Berlin to be a disciple of professor "Stampf". Sometime later he went to "Würzburg" to follow the courses of professor "Kulpe" and there he got his Ph.D. in 1904 and came back to Berlin. In 1910 he went to Frankfurt where he met Kohler and Koffka and there they worked together and produced what was, later on, known as the Gestalt school of psychology. Each of the three had already produced psychological work of some distinction. Wertheimer, for

---

(1) To realize that the Gestalt theory is applicable to all the biological sciences (including psychology) and certain physical problems the reader is referred to "the work of Sheerer, Peterman, Von Bertalanffy and Woodger". For details see Brown "Psych. and the Soc. Order" P.479 footnote.

instance, had shown how the free association test could be used for the dedection of the knowledge an individual hides. This proe cedure was used later in the detection of criminals.

2. Kurt Koffka (1886 - 1941): he had done important work on imagery and thought. He and Kohler were younger than Wertheimer and infinitely more ready to systematize publicly what was daily being discovered through experiments. It is due to Koffka and Kohler, to their vivid personalities and to their tactics of debate that interest in the new school grew wider and wider.

3. Wolfgang Kohler was born in 1887 and was a disciple of"Stumpf" in Berlin.Kohler has specialized effectively in problems of hearing. Later on he was well known for his valuable studies on apes. He was sent in 1913 by the Prussian Academy of Sciences to the Island of Teneriffe, one of the Canary Islands. There he was made the director of an anthropoid station. His subjects were nine apes. In this island he was marooned during the war of 1914 - 1918. There he carried out a series of ingenious studies to test the Thorndike hypothesis that animals learn simply by trial and error. We shall see later the details of his studies challanging Thorndike's hypothesis.

After the coming of Hitler to power, the three pioneers settled in the United States where they spread their ideas. Kohler is still a professor at Swarthmore. Being fluent in many languages, Kohler did more than his friends in making the school widely known. Thus from Germany this school of thought spread all over the civilized world in relatively short time. After the first world war the followers of the school increased, its applications expanded and one of its leaders by the name of Kurt Lewin 1890 - 1947 created

in 1926 a new branch of psychology called topolological psychology.

For better insight into the question we have sketched below (Fig. I) Hartmann's "inverted pyramid" to help us see the development of modern psychology beginning with the field theory which was discussed in the first chapter and ending at the present time with topological psychology which will be the object of the fourth chapter.

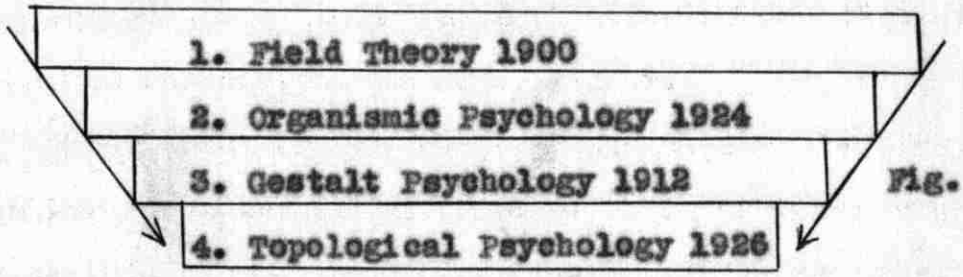


Fig. I

This inverted pyramid drawn by Hartmann indicates the "relations among the major varieties of field theory as these affect psychology. "The arrow", says Hartmann, "symbolizes descending generalty and suggests that each successive layer below the top one is related to its predecessor somewhat as a species is to a genus".(1) Hartmann adds that the "four categories used here share a common temper, but differ slightly in terminology, content, emphasis, and characteristic choice of problems to be investigated."(2) This difference, however, is a superfecial one, because science is one although it investigates different areas.

1. <u>The base of the Field Theory</u> is philosophy, quantum theory,

---

(1) George N. Hartmann, in "The Psychology of Learning", 41st year book of the National Society for the Study of Education, Part II 1942, P. 173

(2) Ibid., P. 173

relativity, logic and scientific method. It was anticipated by Faraday. Its principal spokesmen are: Whitehead, Planck, Einstein, Dewey.

2. The base of Organismic psychology is Biology, especially ecology, physiology, and neurology. Being typically biological it stresses the living body and its adjustments. Its representative spokesmen are: Child, Herrick, Cannon, Lashely, Goldstein, Woodger.

3. As to the base of Gestalt psychology it is standard laboratory experiments in perception, as we shall see. Being typically psychological, the emphasis is put on the representative mental psychic life of the normal adult individual. The spokesmen are: Wertheimer, Koffka, Kohler, as we have seen, and Hombostel in Germany. There is Wheeler in America and Fox in England.

4. Finally the base of Topological psychology is child and group behavior. Hartmann says that this branch of psychology "is now typically'sociological' although initially concerned with issues of mativation, self, and personality that were relatively neglected by (the Gestalt Psychology)."(1) The representative spokesmen are Kurt Lewin, Brown,J.F.

In conclusion there are three contemporary interpretations of Field Theory psychology.

1. Gestalt psychology and its point of reference is perception.
2. Organismic psychology and its point of reference is the human organism.
3. And Topological Psychology and the point of reference is individual and group relationship.

---

(1) Hartmann, op.cit., P.173

Gestalt Psychology like any new movement began as a revolt against the prevailing system, in this case 19th century of analytical psychology. Its strongest attack was directed against Wundt particularly and toward the Associationists in general. The associationists still held the psychology of the 17th, 18th and 19th centuries. The twentieth century they believed should divorce itself from the old fashioned psychology of the 19th century and should develop its own system. This was the attitude of Gestalt psychologists. They were not satisfied with associationism. They insisted that it should be dethroned after having been the sole sovereign system reigning up to the beginning of the twentieth century. In order to show the difference between these two systems, a word of explanation of associationism and its foundations is called for.

Associationism Versus Gestalt: Associationism may be characterized by two things:

1. Its aim was analysis primarily, analysis of the abstract as well as of the concrete. Every experience and every phenomenon should be analysed, otherwise it could not be understood.
2. It restricted its efforts to the mental side of the human activity and called its task "Mental Chemistry". Since chemistry follows the analytical method and studies the elements out of which the components are made, the associationists followed the same lines and used to analyse the experience into the constituent elements. Thus experiences were analysed into thoughts, thoughts into concepts, concepts into images and ultimately all these are reduced to sensation which is no more devisable and no more analysable. Sensation is the basis and the primary element of experience and experience can never be understood unless the sensation is

reached through the analytical process. Consequently, psychology should be mainly concerned with sensations out of which Condillac, the French philosopher made the spirit of his statue.(1) Sensations, therefore, are the A, B, C of the experience.

Gestalt psychology was a natural reaction against this nineteenth century psychology which was essentially concerned with analysing consciousness and behavior. Perhaps the great progress achieved in the different fields of science especially in physics, chemistry and physiology, is the main cause which stamped psychology with this analytical approach. Here are physics and chemistry studying atoms and molecules, and these physiology and anatomy are dissecting organs and tissues, hence what prevents psychology from following the same method ? Why should psychology not isolate and analyse the elements of consciousness, and why should it not do the same with psychological phenomena in order to explain them and interpret them in a better way ? Wundt actually, thought that the conscious experience is complex and it is acquired in a complicated way, hence it is the task of psychology to analyse this experience or any other idea or emotion or attention into their constituent elements, then to study the way these elements mix and synthesise; thus it reaches those laws of mixing and of synthesis.

This has been the antithesis of the gestalt psychology. Conscious experiences are not only complex - as Wundt said - they are also meaningful. The type of introspective analysis which neglects the meaning of the experience in order to get at the bare

---

(1) Paul Guillaume "La Psychologie de la Forme," Ernest Flammarion, 1937, Paris, P.8.

sensory elements may do good service for the special student of the senses but at the cost of losing the larger values of psychology.

Thus Gestalt psychology was profoundly discontented with Wundt's psychology which was called by the first three pioneers (Wertheimer, Kohler, and Koffka) "brick-and-mortar psychology".(1) The sensory elements are the bricks and the mere association by contiguity is the mortar. Naturally, the problem which will arise here is how these elements are linked ? What is the nature of this coherent mortar ? How are the parts of an experience, of an idea, or of an emotion agglomerated ? Here the associationists have only one unsatisfactory answer, which is "association". Association is the factor which holds the elements together, association is the mortar. This hypothesis is not accepted by Wertheimer and since 1922 he used to call it "the mosaic" or "bundle" theory.

Bundle Theory

Here is his exposition of this hypothesis:

"Every 'complex' consists of a sum of elementary contents or pieces (e.g. sensations). Example: If I have a_1 b_1 c_1 and b_2 c_2 are substituted for b_1 c_1, I then have a_1 b_2 c_2. We are dealing essentially with a summative multiplicity of variously constituted components (a 'bundle') and all else is erected somehow upon this and-summation. Thus to sensations are added 'residues' of earlier perceptions, feelings, attention, comprehension, will. Also memory

---

(1) Robert S. Woodworth "Contemporary Schools of Psychology", Revised Edition, The Ronald Press Company, New York, 1948, P. 121

attaches itself to the sum of contents."[1] It is quite obvious that associationists do not see any inherent or intrensic relationship between elements, they do not recognize also any dynamism among the parts. The only factor which brings them together is association by contignity. This interpretation is no longer accepted, and thus this old school was compelled to declare its bankrupsy inspite of the many trials which have been made for its survival through such metaphysical hypotheses as "mind", "spirit" or "self" as factors responsible for association.

Thus the problem remained unsolved until the advent of Gestalt psychology, which does not believe in dissection and elementarism, to find the solution. Gestalt psychology believes in the unified whole, in the general structure, in the configuration or in the Gestalt, from which the school derived its name. The perceived whole is more than the sum of its constituent parts. This idea, however, was expressed by the Austrian philosopher-psychologist Christian Von Ehrenfels[2] since 1890. What be called "Gestalt qualitat" or form quality is present in a whole but not present in any of the parts making up the whole. Thus form quality is a characteristic of the whole alone.

Helson in 1926 said that "Configurational connections are not the results of frequent associations or blind juxtapositions, but are inner blonds imposed by the demands of the total structure. Once this structure is seen, the parts must follow one

---

(1) Max Wertheimer in "A Source Book of Gestalt Psychology", Prepared by Willis D. Ellis, with an introduction by Professor K. Koffka, the Humanities Press, New York, 1950, P. 12

(2) (1859 - 1932)

another in a certain way."[1] This reasoning is quite in line with the fundamentals of field theory which gives the primacy to the whole over the parts. Here we are before a structure the conditions of which will regulate the positions and relational associations of the parts. Thus the problem which was left unsettled by Wundt, has been settled by the gestalt school of psychology.

How the Gestalt School was Founded. When, in 1912, Max Wertheimer first published his paper called "Experimentelle Studien fur uber das Sehen Von Bewegung" in the "Zeitschrift fur Psychologie", Vol.lX (60), 1912, PP.161-265, dealing with the visual perception of movement, the psychological problem becomes "how the Gestalt is formed ?" and "what are the conditions under which it appears ?" To answer these questions Wertheimer conducted many experiments in the Frankfurt Laboratory in 1911 and 1912. Kaffka and Kohler were serving as subjects. The problem was "how do we see motion ?" and "How to account for the motion we see in looking at a motion picture ?" We are all acquainted with the "movies". The movement that we perceive is merely apparent and not genuinely 'out there'. The motion picture camera takes a rapid series of snapshots which are 'stills'; then stationary picture A, for instance, is projected on the screen for a brief moment and then succeeded after a correspondingly short passage of time by another stationary picture B, which differ from A very slightly in showing a later version of the original action or scene being photographed. Thus it is obvious that outside there is discontinuity and break,

---

(1) George W. Hartmann, "Gestalt Psychology", The Ronald press company New York, 1935, P.186.

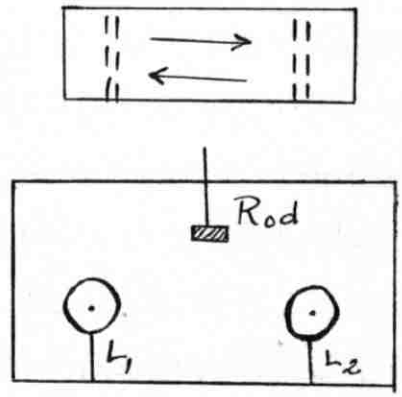
but within the observer under the proper conditions, there is only smooth transitions. How to account for this apparent motion? Actually we do not see exactly what is projected on the screen, otherwise we would have seen a rapid series of snapshots separated by intervals of darkness, because in projecting each still snapshot the light is cut off while the shift is made from one frame to the next.(1) If the picture was allowed actually to move on the screen we would see a blur rather than a moving object. But here one can ask why we do not see the dark intervals since the light is cut off while the shift is made ? The answer is, we see no dark because the visual sensation outlasts the physical stimulus and holds over next exposure, provided the interval is short. This is called the retinal lag. This retinal lag bridges the gaps between successive still views. But the problem is "what bridges the space gaps and enables us to see an object in the picture moving smoothly along instead of jerking from one place to another as it actually does in the series of views ?"

Wertheimer, in order to study this problem more effectively, simplified the "picture" and reduced the whole thing to a vertical line which could be given an apparent motion to the right or left. He exposes to view first one line and then a simialr line a little to the right or left. The two exposures were separated by a short blank time interval. Wertheimer found that when the length of the interval was one second, the observer simply saw one still line and then the other still line, in full agreement with

(1) Perhaps it is worth mentioning that the inventor of the movie was originally a Flemish psychologist or at least physiologist by the name of "Plateau". He was the first to invent an apparatus able to project series of pictures in a rapid succession so that they seemed to be moving. This was about 1830 as says Woodworth in his first edition of "Contemporary Schools of Psychology." 1931

the physical facts. But when the interval was cut down again and again the observer began to get a glimpse of something moving across from one position to the other. When the length of the interval was reduced to one fifteenth of a second the motion was very clear and a single line appeared to move across. If the time of the interval were reduced more the motion was less and less clear until the one thirtieth of a second was reached, then no apparent motion remained and only two presented lines seemed to stand side by side.

One can, however, reproduce what Wertheimer did with the aid of two electric bulbs and a metal upright. (Fig. II) The two bulbs are placed along the edge of a table separated by a few feet; between these bulbs and the wall or a screen, the metal rod is erected. If the two lamps are now rhythmically switched on and off, the shadow cast by the rod will move back and forth between two positions, provided the optimal time interval (about 60 milliseconds) is used. If time between the two light exposures is the appropriate time apparent motion will be seen (this might happen when the interval is around one-fifth of a second).



"Fig.II A Simple Device for showing the Phi-Phenomenon" (1)

Now, the subjective nature of this event was established

---

(1) The figure and the explanation are borrowed from Hartmann's Gestalt Psychology", 1935, P.4

experimentally, but the problem still lay in how to account for this apparent movement ? Wundt believed that the determining factors are those kinaesthetic sensations produced by the "jump" movement of the eyeballs. The eyes he maintained when moving from one position to the other created the impression of motion. But Wertheimer was not satisfied with this explanation and he refused to accept it on an experimental basis. He varied the experiment in several ways. For instance, he exposed a vertical line followed by a horizontal one, thus the observer saw a line swinging around through ninety degrees. He also arranged his tachistoscopic exposures so that the total presentation time for the first object, plus the time interval, plus the exposure period for the second object did not exceed one-tenth of a second. What does this mean ? This means that Wundt's explanation collapsed; because the minimal time for eyeball reactions is somewhat greater than one-tenth, it is around 130 milliseconds. Furthermore, says Hartmann,(1) the motion is seen even with rigid fixation of a definite point in the visual field. The knock-out blow however, came through the following decisive experiment. By suitable arrangements, Wertheimer could make one line appear to move to the right and another line simultaneously move to the left. Thus he got two antagonistic apparent movements - just as in a movie two figures are often seen to move in different directions at the same time. Obviously the eyeball cannot move simultaneously in two opposed directions.

---

(1) Hartmann, op.cit., P.5

There was another explanation besides Wundt's which seems to be of some value. This old explanation is based on the assumption that the motion is not seen but it is inferred. What one really sees is the series of still views and then one infers the motion from seeing the object here in one moment and there in the next moment. Thus from seeing the object in two different places successively one says that it must have moved in the interval from here to there; thus the motion is inferred through reasonning. But again Wertheimer was not satisfied with this explanation; because from one's direct experience he knows that one is not aware of the separate positions first, and then of the motion. On the contrary one gets a direct sensation of movement. Moreover, we can see that if the interval is too long no motion is perceived; we see only two separate lines in succession and we do not infer any motion; the same thing is true when the interval is too short. But only when the interval is just right we get the clear impression of one line in motion.

Still another explanation of the apparent movement was defeated by Wertheimer's experimentation. This explanation was based on Marbe's theory, that after-images of the first object accounted for the motion. Here is how it was excluded: Before the apparent movement was produced, a subject was asked to gaze at a small bright cross (or at a lamp filament), thus a strong after-image was created within him, then the cross was projected upon a definite spot within the field of exposure on the screen; and again the phenomenon was seen despite holding the after-image stationary.

Now just before coming to Wertheimer explanation, it is

fair to mention Lotze's[1] which had been published some fifty years earlier than Wertheimer's. Lotze (1871-1881) was well known for his masterful handling of philosophical and biological problems, because when he studied at Leipzig he took both Ph.D and M.D., and became Professor of Philosophy in 1844 at Gottingen.

Like Alexander Bain, Lotze sought to unify physiological and psychological material in a coherent system. He maintained that psychology must deal with the organism. Being the master of physiology and neuropathology of his day, he held that the nervous system and the mind must not be separated. He insisted on the futility of trying to find mental processes which are not related to physical processes.

He was well known also for his studies on the psychology of emotions which paved the way before modern studies (such as the James - Lange theory). But he was particularly known for his theory of "local signs". In this theory he attempted to compromise between the opposed views, since the days of Kant, on space perception. Herbart maintained that the entire spacial order is acquired through the experience, while Kant held that it is innate apriori. As to Johannes Muller the 'germ' of space perception was innate, while the elaboration of the world of space and our organization of it, was learned. Thus it seems that Muller found such a compromise, but he had not explained how this organization occurs and how each object is seen in a certain relation to each other object. This was the task of Lotze.

---

(1) Lotze was the son of an army physician and was born in 1817 at Bautzen.

Lotze conjectured that each stimulus acting on the retina caused a sensation specifically related to the point stimulated. This specific sensation differs qualitatively from sensations aroused by the same object when it stimulates any other point on the retina. Thus, each point on the retina has its "local sign". But what is the nature of these "local signs" and how are they organized ? To answer these questions Lotze says, that upon stimulation, the eye turns so as to bring the stimulus to the point of clearest vision; when the eye is doing so, muscular sensations arise. Thus the nature of the local signs and their organization into a continuum, to give the world of visual space, was stated in terms of muscular sensations. So when the eye receives a stimulus and moves to fixate it, some "feelings of position" take place. Since every single stimulable point on the retina has a specific local sign and since the magnitude of the movement of each point to fixate its stimulus differs from that of the other, therefore to each retinal point there is an immense graded series of "feelings of position". In the course of time each visual stimulus arouses by association memories of the muscular sensations previousely excited as the eye sought its fixation point. In this way stimuli which were at first nonspatial take on a spacial character.(1) The great importance of this theory comes from its insistence upon the rôle, muscular sensations play in the mental life.

In the light of what we know about Lotze, let us see how

---

(1) Gardner Murphy "Historical Introduction to Modern Psychology" Revised Edition, Harcourt, Brace and Company, New York, 1949, PP. 145 - 148.

does he account for movement. According to him, the visual perception of motion depends upon the sequential stimulation of points on the retina and consequently upon the sequential stimulation of brain regions. When an object moves it causes a track of light on the retina, the stimulation - in track form - is transmitted to the brain and the movement is perceived. This explanation also collapsed when Wertheimer, with his Phi-phenomenon stimulated successively the stationary eye by two lights. Here no track of light existed in any way because both the eye and the lights were stationary.

The Phi-Phenomenon: Therefore, all these explanations failed. They were rejected by Wertheimer on both logical as well as experimental bases. He argued that the perception of motion is an experience which is organically differs from the perception of stationary lights, and that no kind of serial arrangement of static stimulating points can give us this unique type of experience. So, how does Wertheimer account for that fact ? After criticizing all these old explanations he concluded that the very essential of the experience is the manner in which temporal organization of two stimulations occurs, and that the brain rather than the eyes which is responsible for this motion. He concluded "when the interval was right, the brain response to the first position merged by a continuous process into the response to the second position, so that there was actual motion in the brain."(1) This is a genuine "dynamic" occurence which on neither a priori nor other ground requires to be traced to a "static" base. Wertheimer called this observation

---

(1) Robert S. Woodworth "Contemporary Schools of Psychology", 1948, P.124

of apparent motion the Phi-phenomenon, the ⊕ standing for whatever occured between the first exposure and the second. "Under special conditions, 'pure' Phi was obtainable; i.e., the observer saw neither a (the first exposure) nor b (the second exposure) nor the movement, but simply 'something in motion'."(1) You might have seen the curious reversal of revolution in a spoked wheel while watching a moving automobile either actually or in the movie. This is an illustration of the ⊕ process also. Wertheimer's explanation is based upon his physiological hypothesis which implies the existence of central "diagonal functions" or "between-processes". "Whenever a central locus in the brain is excited a concentric neural spread of a certain magnitude occurs around it. If two such spots are aroused, two excitation rings are formed which predispose the areas they embrace to further excitation."(2) This is presumably due to what is called "gradient differences" between adjacent loci of higher and lower potential. Thus this continuous process is explained; there is no need for many stimuli to excite the central area of the brain, one stimulus or two might suffice to excite it all through that neural spread or "the neural circuit". The first and the second exposures were sufficient for the arousal of the phi-process. But the crucial problem which confronts us here is:

How could an unreal stimulus (the one induced in the brain by the real stimuli a and b outside, the "short-circuit") have the same effect of stimulation over the brain as the real

---

(1) Hartmann, "Gestalt Psychology", 1935, P.6

(2) Ibid. P.6

stimulus ?

To this Wertheimer proposes that "wherever two indentical phenomena are found, it is necessary to assume that the corresponding brain-processes are identical."(1) He claims that as far as the personal experience goes there is no difference whatsoever between the perception of real and illusory movements. Since we see the motion both when we are in front of a real motion and when two exposures separated by an appropriate interval occur, Wertheimer is justified to propose that the same central area is excited in a relative continuity giving rise to that whole called motion. "A uniform gray disc and one constructed out of any variety of sections which produce an equivalent visual experience when rotated must arouse the same brain-process."(2)

It is, perhaps, worth mentioning that as early as 1894 Exner tried to explain the motion of a picture, he said:

> The total impression aroused by a picture which moves across the retina is made up of excitation from a great many functionally dissimilar fibers. That we should nevertheless, have a unitary experience, in which the part-sensations are unnoticed, is caused by what I shall term the principle of central confluence. (3)

Exner's explanation seems to be very much similar to that of Wertheimer, except that the former uses the expression "short-circuit". What is the actual difference between these two expressions is still uncertain as Hartmann says.

It is time now to go back to our question and try to

---

(1) op. cit., P.7

(2) op. cit., P.7

(3) Hartmann, "Gestalt Psychology", 1935, P.8, footnote.

answer how the gestalt school was founded and what all these experiments on visual movement have to do with it ? The apparent motion was a clear illustration of a whole which was not a mere sum of parts. When we see an object moving we do not see it in a series of positions; in fact we cannot see the separate positions distinctly because they merge into the movement which is clearly seen. Woodworth gives the illustration of the snapshot of a person running or walking. The camera catches him often in what looks like a very odd position. One can scarcely believe that he took that position in the course of his movement; and yet the camera did not lie. We usually do not see such positions, what we see is the movement as a dynamic whole, a whole which dominates its parts.(1) So, these experiments which show clearly that the motion emerges as a whole, are very significant and of great importance to the gestalt psychology. But should we conclude that Max Wertheimer should be considered the creator of the Gestalt theory and the only one responsible for this way of thinking? I think we will be unfair to the history of the movement if we do so. Nevertheless, Wertheimer's contribution as well as Kohler's and Koffka's should never be underestimated. They actually should be proud of what they did namely of that change they introduced in the intellectual field of human activity. It is true historically, as we shall see, that most of the ideas and concepts which they brought were not new; what they actually did is to integrate the scattered ideas already existent, to systematize them and to add impetus and direction to those inarticulate and uncoordinated trends.

---

(1) R. Woodworth "Contemporary Schools of Psychology" 1948, P.124

This is usually what the leaders of any great intellectual change do. When this is done, the way is paved for a further progress. Thus raising newer problems the solution of which and the reorganazation of their implications, will in turn lead to further discoveries and progress and so on. Boring, in this connection says: "The progress of thought is gradual, and the enunciation of a 'new' crucial principle in science is never more than an event that follows naturally upon its entecedents and leads presently to unforseen consequences."(1) This, of course, happens through the process of insight and reorganization of the available bits of information and deduced data.

The Gestalt school is not entirely new because it had many anticipations. Many of its concepts have been tackled and thought about by non-gestaltist people. This happened, as history tells us, even before Socrates. Probably the first historical record of reflection upon this theme is found in the remark of the Chinese sage Lao-Tse (B.C. 600) in his Tao-te-King, 39th saying "The sum of the parts is not the whole:"(2) Platonism also contains many ideas of Gestalt which may reasonably be regarded as foundation stones for the new theory. Thus through the whole course of history one can find bits of Gestalt concepts; until we reach the eighteenth century which abunds with those psychologists who participated in pushing psychology foreward to become what it is now. Hartley, the British leader of the associationism had

---

(1) Edwin G. Boring, in the "American Journal of Psychology", 1930, 42, from the article "Gestalt Psychology and the Gestalt Movement", PP. 308 - 315.

(2) Hartmann, "Gestalt Psychology", 1935, P.9 footnote.

pointed out that tastes and smells may not only combine in such a way as to produce new qualities, but may be experienced in such a way that the original elements are no longer observable at all. In taking a new medicine, says he, one may not recognize the components, though all of them have been experienced separately at an earlier time.(1) John Stuart Mill in the Middle of the nineteenth century brought the idea of "Mental Chemistry". He considered "Mental Chemistry" a process by which sensory elements become so fused as to give a new entity, which is more than the some of the constituent parts.(2) Alexander Bain, however, expresses more clearly the idea of the whole. He believes that we cannot break up a given mental content into pure sensory elements. Thus he disagrees with the associationists. We cannot, says he, talk about one thing leading to the next by association, just as one clock tick succeeds another. There is, on the contrary a continuous flow, a "stream of thought", and each of the entities ordinarily studied by psychologists is nothing more than a cross section arbitrarily taken out of the stream.(3) William James also accepted this view and elaborated it. He maintained that the process of analysing experience into temporal pigeonholes is absurd. Mental life at any time, he holds, is a unity, a total experience, flowing and changing as does a stream. Thus he was clearly against the atomistic view. The French philosopher Henri Bergson too, thinks in

---

(1) Gardner Murphy, "Historical Introduction to Modern Psychology" N.Y., Revised Edition, Harcourt, Brace and Company, 1949, P.33.

(2) Ibid. P. 104

(3) Ibid.P.196.

similar lines when he says that "the perceptual whole which we experience on a starlit night includes an integration of every thing from the stars we observe to the brain processes which go on during the event."(1) It is obvious now, that all through history there have been people who tackled one or another concept of the Gestalt school's. Even the great German poet Goethe says: "Nature is neither kernel nor shell; she is every thing at once."(2) One can note also that the nearer we come to the modern time, the clearer and the more elaborated the gestalt concepts are. When we reach Ernest Mach, for instance, we see more systematized ideas and a more specific forerunner of the Gestalt psychology. Mach's main thesis was that sensation constitutes the basis of all science both physical and psychological; but he also believed that both the physical world and the psychological are identical. He said, if we see three separate spots, to each of which we react by perception, there is in our perception something more than one spot plus another, plus a third. There is, he adds, a relation present, and that spatial relation is just as much a quality of experience as any of the independent spots before us.(3) Thus the idea of form-quality, which has been elaborated later on by Von Ehrenfels as we shall see, really goes back to E. Mach who since 1885 expressed it in his famous book "The Analysis of Sensations". He believes, for instance, that the spatial quality by which we get

---

(1) op. cit., P.285

(2) op. cit., P.284

(3) op. cit., P.226

triangularity can be observed introspectively just like any other element is observable. If we arrange the dots in different ways, says he, we get different "sensations of space". Inspite of his insistence upon sensations, E. Mach, in my opinion may be classified as a gestaltist. "The tree", says he, "with its hard, rough gray trunk, its numberless branches swayed by the wind, its smooth soft shining leaves, appears to us at first a single indivisible whole."(1) So, he seems to believe not in the pre-analytical but in the post-analytical datum.

After Mach, came Charles Von Ehrenfels. He developed the ideas of Mach and in 1890 he gave them the formulation in which they are most widely known. In fact Von Ehrenfels made decisive step in this new direction. He made it clear that there are qualities in the experience not accounted for by the properties of the generally recognized sensations. These qualities he called "Gestaltqualitaten" (a German word which means roughly, the qualities conferred by a pattern). He held that in all perception these qualities appear; they are qualities added by the subject and they are more than separate sensory entities. Thus from Von Ehrenfels came "the most important impulse"(2) in the direction of gestalt psychology, as Wertheimer says. Ehrenfels raised the following problem: Psychology has said that experience is a compound of elements, but this is a questionable statement. We hear a melody and then, upon hearing it again, memory enables us to

---

(1) Hartmann, "Gestalt Psychology", 1935, P.9 footnote.

(2) Willis D. Ellis "A Sourde Book of Gestalt Psychology", 1950, P.4

recognize it. The question is now "what is that enables us to recognize the melody when it is played in a new key ?" It is obvious that the sum of the elements in each case differs, and yet the melody is the same; in fact, one is often not even aware that a transposition has been made. Or more strictly interpreted, Von Ehrenfels position was this, as Wertheimer puts it:

> I play a familiar melody of six tones, and employ six new tones, yet you recognize the melody despite the change. There must be a something more than the sum of six tones, viz, a seventh something, which is the form-quality the gestalt qualitat, of the original six. It is this seventh factor or element which enabled you to recognize the melody despite the transposition. (1)

Thus, Ehrenfels solved the problem by adding a new factor, a new element to the experience. It should be noted here that this element is not a sensation; "it is a new element created by the intellect operating on sensational elements. Out of them the intellect creates the form."(2)

Ehrenfels's explanation of the question was not the only one presented. Some other explanation, for instance, added to the six tones what they called "relations-between-elements". A third one added what was called "higher process". Those "relations-between-elements", and that "higher process", were considered to be responsible for producing unity, but all of them failed. Nevertheless all these solutions may be considered as steps ahead, but none, according to Wertheimer was the right solution. It was not until a full twenty years after the publication of Ehrenfels's original paper that the concept was further developed. "The

---

(1) Willis D. Ellis, op. cit. P.4

(2) Edna Heidbreder, "Seven Psychologies", D.Appleton-century Company Incorporated, New York, 1933, P.336.

bearing of this new development", says Koffka, "is most easily understood when the relation between mechanism and vitalism is reconsidered... The solution of the problem was indicated by Max Wertheimer and Wolfgang Kohler."(1)

How did Wertheimer solve the problem ? A melody played in a new key may have no element in common with what is already known, yet be instantly recognized. A geometrical figure, a triangle is "transposable" also like a melody;its lines may be black or red and yet the figure remains a triangle. How ? We have just seen where Ehrenfels stoped and how Wertheimer was not satisfied with the gestaltqualitat he added. Here is how Wertheimer accounts for the fact:

> This was the situation until Gestalt theory raised the radical question: Is it really true that when I hear a melody I have a sum of individual tones (pieces) which constitute the primary foundation of my experience ? Is not perhaps the reverse of this true ? What I really have, what I hear of each individual note, what I experience at each place in the melody is a part which is itself determined by the character of the whole. What is given me by the melody does not arise (through the agency of any auxiliary factor) as a secondary process from the sum of the pieces as such. Instead, what takes place in each single part already depends upon what the whole is. The flesh and blood of a tone depends from the start upon its role in the melody: A (b) leading to (c) is something radically different from the (b) as tonic. It belongs to the flesh and blood of things given in experience (Gegebenheiten), how, in what role, in what function they are in their whole. (2)

Thus going from one success to another, by trying to solve old problems in new and better ways, and by bringing out

---

(1) Kurt Koffka, in the "Encyclopaedia of the Social Sciences", Vol. VI The Macmillan Company, New York, 1931, PP. 643 - 644.

(2) Willis D. Ellis, op. cit. PP. 4 - 5.

newer problems the Gestaltists established firmly their own school of psychology which is still gaining momentum. Actually the new trend in science in general, psychology included of course, is in line with the conception of Gestalt theory and Gestalt psychology. The prevalent view, in the original field of research, perception, is that of gestalt psychology. A gowing major part of the psychology of learning is now most readily treated on the basis of gestalt theory. Since the gestalt psychology is mainely based on the priority of the whole, as we the reader might have felt, let us try to know more about that idea, which has some philosophical foundations as well.

Chapter III

The Organized Wholes in Gestalt Psychology

From the foregoing discussion, it is obvious that the point of emphasis in gestalt psychology is upon the whole, the organized whole and not upon the dismembered parts. This is perhaps the most conspicuous characteristic of the Gestalt school. It is from this standpoint that this school treats the different topics of psychology. The whole being different from the sum of its parts, this school denies the possibility of knowing the whole through knowing only its constituent parts. That is why when they study emotional expressions, for instance, they do not study every part of the face separately and then combine them together in order to have a complete picture of the complex emotion. They rather study the face as a whole, because they were able to show experimentally that the expression seen on one part of the face, changes when the other remaining parts change. This was observed, inspite of the fact that no objective change happened to that particular part. Again if you show only the upper part of the face, in which only the eyes are seen, then if you show the rest of the face, you will see that the eyes themselves underwent a change, in order to fit in the total structure.

The entire emotional life is considered as a whole, emotions are not separated from the body and are not as Walter Cannon says, restricted to the "thalamus". Emotions, say the Gestalt psychologists involves the whole living organism. This, however, should not prevent us from confessing that Cannon made a revolution in the conception of emotional life. He called the attention of psychologists to some physiological concepts such as

the function of the mid-Brain in emotions. He published all this in his famous book of 1915.*

In the same way Gestalt psychology studies personality, which is perceived as a dynamic whole, rather than the sum total of individual traits. Just like the melody, each trait if taken separately is entirely different from what it would be in the pattern of personality. By traits we mean the "quantitative variations between individuals which follow generally the normal probability curve".(1) Gestalt psychology considers personality to be the pattern or arrangement of the personality traits in an individual. What makes the personality is the way in which the traits are arranged and combined to give the individual his individuality. By individuality of the person, Brown means "that dynamic organization or configuration of traits which determines the individual's unique adjustments to his environment."(2)

Thus the whole, the dynamic whole first of all is the concern of gestalt psychology and not the parts or the clusters of parts. When we look at the world about us, say the gestaltists, we see objects like trees, stones, clouds, persons etc. we see unified wholes and not clusters of sensations.

Living bodies however are better examples of gestalten. The living organism is not the mere summation of the constituent parts, it is a well organized whole; its parts are related by the blood circulation and interconnected by the nervous system,

---

(1) "The Psychodynamics of Abnormal Behavior", J.F. Brown, with the collaboration of Karl Menninger, McGrow-Hill Book Company inc., New York, 1940, P.13

(2) Ibid., P.13

* Walter B. Cannon (1871-1945) "Bodily Change in Pain; Hunder, Fear and Rage".

as we all know. This does not mean, however, that some of the parts are not better connected than the others; but this also does not deny the fact that the living organism acts as a whole and that his behavior is not a mere sum of reflexes, as some have said. Sherrington, one of the excellent students of reflexology, has made it clear that the simple reflex is nothing but a conventional abstraction; he attempted to prove that the nervous system acts in an integrative way. Ivan Petrovitch Pavlov has shown also that every conditioned reflex is related to another one. Even J.B. Watson, the pioneer of behaviorism maintained that we think with all our body and not only with our head.

Constancy Hypothesis

Let us turn now to the problem of constancy. This constancy might be connected with size, color, motion, rectangularity (of a rectangular object) etc... The problem may be stated as follows: When we look at a rectangular table, we perceive it as a rectangular form, both when looked at from above, or from across the room, or when we stand beside it. This occurs when the retinal image itself is not a rectangle as it can be demostrated in the laboratory. With different situations we usually get different retinal images e.g. different quadrilaterals. Now, the problem is how to account for the actual perception ? How this perception is related to a retinal image so different and varied ?

The old psychology used to account for it as follows: The "core" of the percept is the mass of sensations corresponding to this irregular quadrilateral of retina. But in spite of this,

we perceive the table as a rectangle; this is because we have learned through countless occurences of the same sort, that objects of that apparent shape, situated in just that relation to the eyes, are really rectangular. So, the previous experiences have been accumulated in such way as the separate items have become very intimately interconnected and immediately associated with a particular sensory stimulation. Now, whenever the central "core" of sensation is aroused, the whole mass is touched off. Thus "the 'core' of sensation has acequired an elaborate context; that context is meaning; and meaning gives the percept its character."(1) This was Wundt's explanation.

The same problem arises when the constancy of size is examined also. The retinal image of a man who stands six meters away, is half of that retinal image you get of the same man when he is only three meters away; and yet the man is the same and is not seen as being reduced to half. Again the older explanation was that through our experiences we learned to interpret the size of the retinal image in terms of distance. If (x) is the size of the retinal image of a person standing three meters away, when we get a retinal image the size of which is x/2 this should mean to us that the person stands double the distance away from us. This is learned from countless experiences as we have just seen.

This explanation of the constancy problem was rejected by gestalt psychologists, because it is primarily based on the "doctrine of elementarism", or what Wertheimer characterized as

---

(1) Edna Heidbreder, "Seven Psychologies", 1933, P.339.

"bundle hypothesis" which we discussed on Page (41). Wundt does not explain how the "bundles" are held together and how experiences of different sorts are associated with one another. Perhaps, the most difficult question is how all these experiences are related to the "core" of sensation ! If the answer is: they are held by mere "and-summation", to use Wertheimer's phrase, the problem is not explained at all. Thus, "if experience is broken into artificial bits, some artificial means must be devised of putting it together again, and bonds of associations are the result."(1) Hence, to begin with elements is to begin with the wrong end. We do not see "bundles" of elements, nor masses of sensations, but we see wholes; we see trees, sky, objects; we see gestalts which are primary to the parts and fundamental to them. Kohler, however, shows the inadequacy of that explanation based on learned perception, through the accumulation of countless experiences, by saying that we see the table as rectangular literally thousands of times to the one time we see it as an irregular quadrilateral. These thousands of experienes, he adds, are the ones we actually use in our dealing with tables. If the "meaning theory" were true and if we need so many experiences to recognize such a simple object as a table, how many thousands of experiences and what enormous amount of learning have to take place before a complex object like the human face could be recognized as the same in all possible positions and conditions of light and shade! Yet simple observation shows that the human

---

(1) Edna Heidbreder, op.cit., P.340.

face is one of the first objects the enfant recognizes. So far, we have seen how the association school failed in trying to account for the constancy problem. Nevertheless, this common sense explanation remained unquestioned for a long time because no need for evidence has been felt. Let us now try to see how the gestalt school accounts for this problem. This school believes that the sensorial brain processes and the "situation" are unseparable parts of the same whole. This does not mean that the distance has nothing to do with the constancy of size, for instance. The brain reacts not only to the object and to the distance but to the situation as a whole. Thus according to the gestalt psychologists the essential brain reactions are not confined to the stimulation coming from the retina, but they depend greatly upon the whole situation. Thus the same mechanism which occurs in the brain when we perceive the apparent motion, also occurs when we recognize an object to be the same in different situations. When the stimulus reaches the brain, the stimulus changes into an organized dynamic interaction or into what Wertheimer calls a "cross-Process".

The Philosophical Foundations

It is obvious now, that the gestalt approach is a holistic approach and gestalt explanations of phenomena are based essentially on the "primacy of the whole". This fundamental idea is not a haphasard one; it derives its strength and meaningfulness from a philosophical theory. Here is how Wertheimer(1)

---

(1) See Chapter II, P. (35)

states it: "There exist natural circumstances in which what happens in the total is not conditioned by the nature of the parts or their mode of combination, but on the contrary, what occurs in any part of this whole is determined by the inner structural laws of this entirety."(1) This idea which has often been repeated implies that there exist laws in this universe and hence there exist order and organization. Each part in this organization should play the appropriate role in order to fit in the whole, whenever the whole changes the role of each individual part changes correspondingly to restore the balance. Again borrowing musical anologies, like most of the Germman Gestaltists do, Wertheimer says in this connection:

> suppose the world were a vast plateau upon which were many musicians. I walk about listening and watching the players. First suppose that the world is a meaningless plurality. Every one does as he will, each for himself. What happens together when I hear ten players might be the basis for my guessing as to what they all are doing, but this is merely a matter of chance and probability much as in the kinetics of gas molecules. - A second possibility would be that each time one musician played c, another played f so and so many seconds later. I work out a theory of blind couplings but the playing as a whole remains meaningless. This is what many people think physics does, but the real work of physics belies this. - The third possibility is, say, a Beethoven symphony where it would be possible for one to select one part of the whole and work from that towards an idea of the structural principle motivating and determining the whole. Here the fundamental laws are not those of fortuitous pieces, but concern the very character of the event.(2)

So, we cannot suppose the world to be a meaningless plurality, because this supposition prevents us from comprehending and understanding this world and its laws. On the other hand, the

---

(2) Wertheimer in "A Source Book of Gestalt Psychology", Willis D. Ellis, 1950, P.11.

(1) Hartman's "Gestalt Psychology", 1935, P.63.

gestaltists maintain that "elements" should not be placed together as fundaments in "and-summation" and under conditions involving "extrinsic" combinations. On the contrary, they hold that "elements" are determined as parts by the "intrinsic" conditions of their wholes and are to be understood as parts relative to such wholes.

Their philosophy goes on to imply that even the wholes might be functional parts of larger wholes. It is the task of Gestalt 'category' to find out which parts of nature belong as parts to functional wholes, and to discover their position in these wholes. Thus we can see their degree of relative independence and the articulation of larger wholes into subwholes. In this connection Koffka says:

> Since most wholes are organized into more or less independent subwholes, each larger whole may ultimately be proved to be a subwhole of a still larger one; and only the progress of science can show where each whole has its final boundaries or whether this final boundary does not coincide with the boundaries of the universe. (1)

This is in fact a comprehensive philosophical point of view, each whole we see might, at the end, be only a subwhole of a larger whole which in turn might be a subwhole to a larger one and so on, until the entire universe is perceived acting as a perfectly organized whole. This perfection of organization will come only through the permanent progress of science which will show more and more the unity of the universe. The most interesting idea which is implied in this philosophy is that progress and scientific discoveries are imperative as long as the living organism deals with his environment.

---

(1) K. Koffka, in the "Encyclopedia of the Social Sciences" Vol.VI, 1931, P.645.

This is well explained through two laws of the "Gestalt" which are the most important ones, namely the law of "closure" and that of "Pragnanz"[1] which will be discussed soon in this chapter.

a. Organic Versus Mechanistic

It is obvious now that the whole system of Gestalt school is based on the primacy of wholes or on an organismic view rather than on a mechanistic view. Let us see briefly, how each view explains its point:

The Mechanistic View: maintains that parts come first, the wholes come later, by getting put together from the parts through the agencies of hooks or bonds. The automobile, they say, is constructed by joining the parts together. Before the wholes are formed, there is nothing in the world but the elements. There is no organization, they argue; we have electrons and protons but not atoms, chemical elements but no compounds, cells but no bodies, sense-impressions and other kinds of experiences but no minds, no personalities, individuals but no societies, not even the family.[2]

The Organic View: These people's argument runs as follows: If parts existed in the beginning, they must have been parts of

---

(1) Because the writer has not mentioned here the meaning of these two laws, a gap has been created in the mind of the intelligent reader who had not made their acquaintance; therefore the argument which is going on on this page does not form an organized whole, with no gap in it, until the laws are known. This is just an illustration of the law of "closure". As to the law of "Pragnanz" we say that the state of mental rest and balance is not reached until the gap is bridged in the best way, the different conditions provide.

(2) Raymond Holder Wheeler, "The Science of Psychology", 1940, PP. 17-18.

something at the time they originally existed. Part of what ? Parts of wholes of course. These wholes must have been primary. Furthermore, if we start with parts, how are wholes to be obtained ? If, from the beginning, the elements are totally unrelated to one another, how can relations be obtained afterward ? Therefore, if we do not begin with the parts and relations together, we cannot begin at all; because if we have no relations at the beginning we cannot have them at the end. And, yet if we start with the parts and their relations, we are after all starting with wholes and not with parts.(1)

b. The Monism of Gestal School

Thus the primacy of the whole is established not only in the field of psychology but in any other scientific field as well. This is because the Gestalt school or the field theoretical approach is monistic. "Intrinsically", says Hartmann, "the realism of Gestalt considers mind, or rather mental processes, not as something outside of nature, but as just such natural events as any other. They are links in the chains of reactions produced by an organism in an environment, and cannot legitimately be isolated from this context." "The monism of Gestalt", adds he, "is implied in the assertion that one and the same reality are expressed in two different conceptual systems - the psychological and the physical."(2) According to the Gestalt school, therefore, there is no difference between the physical and the psychical; they are two aspects of the same whole. Kohler maintained that the physical

---

(1) R.H. Wheeler, op.cit., PP. 18

(2) Hartmann, Gestalt Psychology", 1935, P.71 footnote.

and mental laws are identical and he was the first to apply the Gestalt facts to physics and biology. Raymond Wheeler, the American writer who is considered the one who offered the most systematic and encyclopedic exposition of Gestalt psychology, followed enthusiastically in the steps of Kohler when he formulated his 'eight organismic laws'. Wheeler does not accept the ancient problem of materialism versus vitalism. He traces this dualism to the difficulty the Greeks encountered in applying the 'structural' and 'functional' points of views with apparently opposed conclusions, the one being a question of composition and the other a matter of activity. This problem, says he, persisted in European philosophy and got another name later on, and was known by the problem of 'static versus dynamic'. Wheeler's solution to this problem is that "Structure and function are merely aspects of each other; the same thing is envisaged first from a static and then from a dynamic point of view. Structure is the form of an activity, a something moving, or something that changes; function is the activity of the form, the moving or changing of the thing. Structure and function have opposite but mutually dependent meanings."(1) Wheeler, therefore, sees dependence and relatedness between structure and function or rather between physical and psychical which form a larger whole into which both mind and matter fit. He offers the following illustration to demonstrate the unreality of the distinction between the two. Wheeler says:

---

(1) R.H. Wheeler, "Laws of Human Nature", D.Appleton-Century Company Incorporated, 1932, New York, P.9

> Hold up your little finger and wiggle it, you see a movement. But where is this movement ? Is it in the finger or outside of it ? You can cut open the little finger which is a structure but the movement is not inside, of course. Is it outside of it ? It is not independent of the finger also. So where is it ? It is something the finger does; it is a function of the finger.

Similarly, says Wheeler, an idea is not in or outside of the brain; it is rather something the brain does. If we cut open the brain, for instance, no idea will be found inside of it. "These A B C's of dialectics", adds Wheeler, "are useful, inspite of the fact that they sound rather foolish; for they show how there are just as many phenomena of the so-called physical as there are of the mental. These phenomena are processes, events."(1) Thus Wheeler, really, unifies, just as Kohler does, the two so-called kinds of phenomena and considers them all under the caption of "processes or events" in nature. He believes that the study of these "processes or events" is the task of science. "Science", holds he, "investigates events that have no claim to material versus mental substantiality."(2) Following this line of reasoning, which shows the identity of both the physical and the mental, one is led to admit that same laws governing the one are governing the other. As a matter of fact, the implications of this reasoning lead us to believe that the universal laws of nature are no more peculiarly physical than they are phychological. This is what exactly happened to Wheeler when he formulated his organismic laws. These laws he maintained are the laws of energy and dynamics. They are mental concepts which

---

(1) Wheeler's, op.cit., P.23

(2) Wheeler, op.cit., P.23.

all the sciences or any human interprise may share, since man and cosmos are both governed by just the same principles. Let us see now what are these laws ?

C. Wheeler's Organismic Laws

1. Law of Field Property: This first law states that "wholes exist in their own right over and above the parts or ingredients, from which through closure,[1] they were formed."[2] This means that any integrated whole which is more than the sum of its parts is a whole in its own right. Water, for instance, has properties which are not characteristic of either of its ingredients hydrogen or oxygen.

2. Law of Determined Activity: This law states that "The whole regulates the activities of its parts, or, the whole conditions the activities of its parts."[3] This means that it is not enough to know each part independently, if we consequently want to know the whole, Exact prediction of an event is possible only when the larger frame work within which it occurs is known. It has been demonstrated that early transplantation of tissue from the head end to the tail, results in the growth of a tail and not of a head. Why ? This is because the developmental future of each cell is conditioned by the total organism, the whole.

3. The Law of Derived Properties: It states that: "The properties of the parts are derived from the wholes of which they

---

(1) See page (82)

(2) Wheeler's "The Science of Psychology", 1940, P.26

(3) Ibid.

are members.[1] This is a very interesting idea and a very strong shock to elementarism. This means that the parts have no properties of their own; they rather derive their properties from the whole. The concept of weight will, perhaps, be a good illustration here. A chair, for instance, has weight but this weight has no independent existence; it is derived from the gravitational system. The weight is merely a relation between the body and the gravitational system which contains it. Actually, it is not difficult to derive this law from the 'law of determined activity'.

4. The Law of Individuation: This law states like this: "Parts emerge from wholes through a process of differentiation or individuation."[2] This is obviously seen in the process of growth which is characterized by proceeding from the undifferentiation to the differentiation. It is seen also in the fertilized cell when it grows and devides to give rise to newer parts. Emotion, thinking, perception, all may illustrate this law of individuation.

5. The Law of Field Genesis: This law states that "wholes evolve as wholes."[3] This means that when you first saw a square, early in childhood, you saw it as a whole before you realize its properties (equal lines and equal right angles). You saw the square as a segregated whole and you could distinguish it from a circle or a triangle. Then as you grew older your perception of a square expanded in the amount of detail it involved. Thus the square was an evolving whole; but as the details became

---

(1) Wheeler, op.cit., P.28

(2) Hartmann, "Gestalt Psychology", 1935, P.73

(3) Ibid., P.74

recognizable it was still a square, a whole square.

6. The Law of Least Action: This law may be stated as follows: "Energy interchange takes place through the shortes spatio-temporal interval."(1) Water, in nature, runs from high to lower places; electricity 'flows' from high to low potential. We often do not notice the misspelled word and correct unconsciously the error. One can find many other good illustrations in the balance in art and symmetry in objects. This law was first publicly enunciated in the 18th century by Maupertuis, but it was put into serviceable form by Euler, lator on.(2)

7. The Law of Maximum Work: This law states that "If a whole is a single, integrated piece, or system, no one of its parts, regardless of their number, can be affected in any way without affecting the whole."(3) Strike your fist against the table and the table is jarred from end to end. Open the door of the room and the air pressure in all its parts is instantly disturbed. In the human being an exaggerated trait distorts the whole personality. Thus the disturbance of a part within a whole will place the whole in a state of tension or unbalance between the parts; then action will take place to restore the equilibrium (Law of least action). After this explanation of the 'law of Maximum Work' Wheeler put it in the following form: "For any given set of conditions all of the available potential energy of the whole will be expanded in the course of maintaining a condition of equilibrium or balance, i.e.,

---

(1) Hartman, op.cit., P.74

(2) op.cit., P.74

(3) Wheeler, "The Science of Psychology", 1940, P.103

in preserving its status quo."[1] This law is, therefore, 'the self-preservation' law of energy systems, whatever they may be. "Systems of energy", says Wheeler, "are conservative, they resist change; and when disturbed they automatically train their energies in such a way that their status quo tends to be maintained."[2] This law, according to Wheeler, offers us scientific explanation of so many phenomena. When we see a person fighting to prevent his destruction, we usually explain his behavior in terms of the mystical instinct of self-preservation. This is no more an acceptable explanation; his behavior should be explained in terms of the 'law of Maximum Work'. The same thing may be said when a nation goes into war and the same is true vis-à-vis of any other system of energy be it social, psychological, biological, chemical or electrical.

We should note here that the 'Law of Least Action', and the 'Law of Maximum Work' are related and not contradictory as one might think. The former refers to the path or route taken by a part within a whole; it explains how any given amount of energy shall be expended. While the latter tries to show how much energy is available for expenditure under 'Least Action'. Thus the two laws are complementary and not contradictory.

8. The Law of Configuration: This last one states as follows: "A system of energy responds as a whole to a multitude of simultaneous disturbances, and to each disturbance in its relation to the others."[3] This means that, we as human beings,

(1) Wheeler, op.cit., P.104
(2) Ibid.
(3) Ibid. P.188

we respond always as wholes to whatever stimuli happen to act upon us. When the eye of an individual is stimulated by the light, the whole individual responds, not only the eye and not only a particular part of the brain. The same thing is true when the ear is stimulated. What happens now, when several stimuli are acting upon an organism at the time ? What effect each one will have ? Wheeler says, that the effects that one of the stimuli will have, depends upon the effects that all of the other stimuli are having at the same time. S_1 produces R_1 in one time and R_{20} in the next time; there is not a one-to-one correspondence between cause and effect, or between stimulus and response. A joke which is welcomed in a pic-nic, might not be so, or it might turn to be an insult in a formal reception. It all depends upon the other stimuli and conditions; this is because the organism does not respond to an absolute and independent stimulus, it rather responds to one stimulus in its relation to each of the other stimuli.

These are the eight organismic laws which, according to Wheeler, are as readily applicable to problems of conscious behavior as to the so-called physical and biological problems. In the light of these laws all psychological phenomena are explanable; hence there is no more need for the complicated old explanations based on artificial principles such as attention, association, experience and memory-traces. These are to be rejected as 'tautologous' as Hartmann puts it. This is in line with what Gestalt psychologists believe, although Brown sees some basic difference between Wheeler's position and that of gestalt theory. Dealing with these 'Organismic Laws', Brown said: "I believe the only

basic difference between Wheeler's position and that of the gestalt theory is that Wheeler would allow speculation an even freer hand."[1] Then Brown added:

> Some of the well known organismic laws (those of least action and maximum work) may not be looked on as methodologically completely adequate as they contain concepts which are not as yet operationally definable. Other of the laws (individuation, derived properties, field genesis) for instance, are quite adequate postulates of a non-metrical character and are based on experimental evidence.(2)

Then Brown ends by agreeing with Wheeler's position, in saying:

> In a young science (i.e., psychology) speculation is undoubtedly of great value and it is quite possible that in the very near future even the laws of least action and maximum work may be given experimental verification. (3)

Transposition: Before leaving Wheeler we had better see another principle of his elaboration called "The Process of Transposition". This process, says Wheeler is exceedingly important in nature anywhere. By transposition he means "the conservation of a whole while the parts change."[4] The process of growth is a good illustration; we receive from the air and the food energies which are transformed into heat and motion, consequently we grow and yet we do not lose our identity; our organism remains the same organism. We already saw the transposition of a melody from one key to another and yet the whole melody did not change. The gas flame is another example. The fuel is burned up and yet the flame stays there. Transposition, therefore, is a case of conservation which may be stated of another organismic

---

(1) J.F. Brown, "Psychology and The Social Order", M.Graw-Hill Book Company, Inc. New York & London, 1936, P.483

(2) Ibid. P.483

(3) Ibid. P.483

(4) Wheeler "The Science of Psychology", 1940, P.186

law, under the name of "law of Transposition" as Wheeler calls it. This law states, "Wholes can be preserved while their parts change."(1)

So much for Wheeler and his organismic laws. Let us turn now to our previous questions about wholes. How do we see objects as organized wholes and not as separate parts ? How do we perceive the organized wholes or the gestalten ? Wertheimer says: "I stand at the window and see a house, trees, sky"(2) and not independent parts. Why ? The answer is, because there are laws according to while one organizes his perceptual forms. These laws were discovered by the gestalt school of psychology, when it studied the phenomenon of perception. Here are some of these laws which are called "Laws of Organization In Perceptual Forms"

Laws of Organization In Perceptual Forms: They are called also, laws of gestalten. These gestalten by the way are not rigid structures composed of rigid units; they actually show different degrees of stability; why ? It is up to these principles to answer our 'why'. Actually; these principles are many, but we shall be satisfied with some of them which we consider more important than the others.

1. Principle of Proximity: In 1923 Wertheimer made good use of dots and lines scattered in front of him, in demonstrating the factors which make for aggregation and segregation. He found that the factor of 'proximity' or 'nearness' forms a favorable

---

(1) op.cit. P.187

(2) Willis D. Ellis "A Source Book of Gestal Psychology", 1950 P.71

condition to organize these dots into figures. The dots are not seen as just a meaningless sum. Let us consider now this row of dots presented upon this homogeneous ground:

a b c d e
• • • • • • . . . . (I)

The normal tendency here is to see this row as ab/cd and not as a/bc/de and even if the observer tried to see it in the latter way he would see how strong a tendency is working against him. This fact is due to the nearness of dots; the nearer they are, the stronger the resulting figure will be. This is what is meant by the principle of 'Proximity'. "That the principle holds also for auditory organization can readily be seen by substituting tap-tap, pause, tap-tap, pause, etc. for (I),"[1] says Wertheimer.

2. Principle of Similarity: If the field contains dots of two shapes or colors, those which are alike can easily be seen as forming a different group. Here is an example in which an identical proximity throughout is maintained but the color of the dots themselves is varied:

. . . . . (II)

or, this example:

(III)

or, again this[2]:

. . . . . (IV)

In all these examples the tendency of like parts to hand together is well seen. Therefore, the dominating factor here is similarity.

(1) Willis D. Ellis, op.cit., P.72

(2) These examples are adapted from ibid. PP. 74-75.

This principle is applicable also to auditory experience, says Wertheimer.

> maintaining a constant interval, the beats may be soft and loud 'analogous to (II)' thus: ..!!..!! etc. Even when the attempt to hear some other arrangement succeeds, this cannot be maintained for long. The natural grouping soon returns as an overpowering 'upset' of the artificial arrangement. (1)

In this article Wertheimer raises this problem: "What will happen when two such factors appear in the same constellation ?" His answer is that "They may be made to cooperate; or, they can be set in opposition, as for example, when one operates to favour ab/cd while the other favours bc/de."(2) Look at this example:

. . . . (V)

Here, both similarity and proximity are employed. As an illustration of opposition in which similarity is dominating despite the preferential status given to proximity," look at this:

. . . . (VI)

When both similarity and proximity function together toward the same end, the prominence of the verticality, in the following example, is greatly strengthened:(3)

. . . . .
. . . . .
. . . . . (VII)
. . . . .
. . . . .

Cases like this in which 'proximity is predominant' a gradual increase of interval will end by making similarity the predominant

---

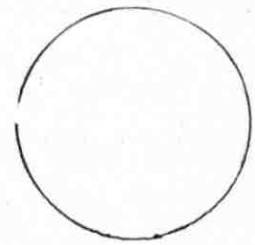
(1) op.cit., P.75

(2) Ibid. PP. 76 - 77

(3) Figures V, VI, & VII are also adaptations from Wertheimer, ibid. P.77

factor. Thus "By appropriate variations," says Wertheimer, "either factor may be weakened or strengthened."(1) Hence, it is possible to test, in this way the strength of these factors.

5. Principle of Closure: This principle is of prime importance in the gestalt theory. The dots tend to form a closed figure or a continuous curve. If you have a figure (a circle for instance) having a small gap in it, this gap is usually overlooked and unseen or rather not perceived. This holds true even when the figure have many small gaps in it; they are disregarded by the observer, who tends always to see complete and more meaningful wholes. When looking to the optician's eye chart at a distance slightly beyond the point of clear vision, there is a common and strong disposition to see a C as an O or an S as an 8, this is "presumably," says Hartmann, "because photo-electric gradients in the retina are better balanced or discharged by these fuller and more rounded figures."(2) Hartmann presents the following figure(3) as"one of the most dramatic concrete proofs" of the immanent tendency of segregated wholes to remain wholes and to move in the direction of 'maximum simplicity' : Here is how to proceed:

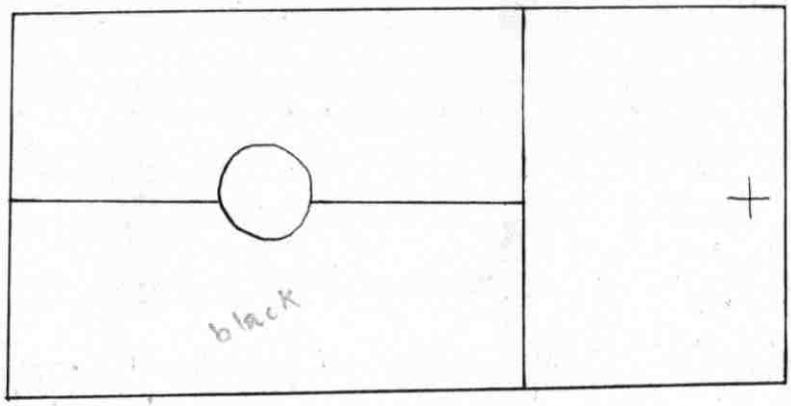


---

(1) op.cit., P.77

(2) Hartmann, in "The Forty-First Yearbook"- Part II - The Psychology of Learning", edited by Nelson B. Henry, The University of Chicago Press, Chicago 37, Illinois, P.178

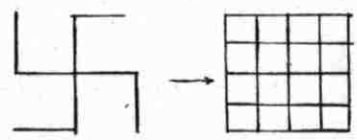
(3) Ibid. P.178



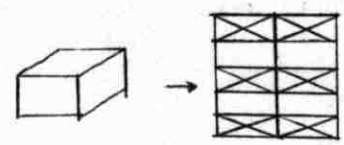
"Material for a blind-spot experiment upon oneself."

Close the left eye and fixate the right eye from a distance of about 6 in. upon the cross: The white circle disappears altogether (because it strikes the 'blind spot' in the right eye) and the black and white areas adjacent 'fill in' and divide the sapce evenly so that nothing but continuous straight line border is perceived. (1)

Thus the whole is speedily produced out of the available parts. Not only this, but also many familiar figures that have been "over learned" may be hidden or imbedded in different settings. The Swastika[2] of the Nazis, for instance, has been seen countless times by almost every one of us, yet few who look at the big square with sixteen inner squares identify it, spontaneously, in this linear context. The same is true with the simple box figure which is strongly three-dimentional when alone; this figure vanishes utterly when obscured within the normal two-



(I)



(II)

---

(1) op.cit., P.178

(2) These gigures (I) & (II) are taken from Hartmann, ibid. P.179

dimentional X design beside it. Here it is worthwhile to note that when the box figure is discovered in the X design, it "pops-out" suddenly as a unit; the observer does not recreate it laboriously line by line and angle by angle. Thus we perceive wholes and closed wholes. This principle of closure applies also in the realm of hearing. Suppose we have this simple pattern of taps:

\- - - ' - - - ' - - - ' - -

when we hear them all and come to the last group of taps, we feel a tendency to add a third tap to this group, in order to make a complete whole.[1] This is a phenomenon of closure also.

It is time now to raise this question: "What is this tendency toward closure ?" Why do we usually tend to make complete wholes and why are we not satisfied with uncomplete ones?" The gestalt psychologists maintain that the imperfectly formed neural patterns - each perceived object having its own neural pattern - create tensions or gradients leading inevitably to their own completion. Completion therefore releases tensions. The configurationist holds that a problem, for example, presents itself as an open gestalt which 'yearns' for closure, e.g., for solution; it is the business of thought to find this solution. Now, does any solution work ? No, of course; the solution which works is that one which transforms the open gestalt into a closed one; thus no more tension is felt. "From this point of view," says Hartmann, "an intelligent person is one who is able to transpose one situation into another

---

(1) Edna Heidbreder, "Seven Psychologies", 1933, P.353.

and to reconstruct his perceptual field".[1] We shall see later on how Lewin shows that perception in its highest degree is nothing more than the reconstruction of the cognitive field.

So much is enough now for the 'Principle of Closure' inspite of the fact that this principle is very fundamental because the whole dynamics of the brain is built upon it. The brain does not allow easily the existence of gaps, because tension is built up on both sides of the gap and a state of disequilibrium is created. Unless the brain activity bridges the gaps this state of disequilibrium remains. Kohler has shown very competently the similarity between these mental phenomena and the physical ones, in his book "Dynamics in Psychology", 1940.

4. Law of Pragnanz: This principle was introduced also by Wertheimer. Here is how Koffka states it briefly: "Psychological organization will always be as 'good' as the prevailing conditions allow."[2] But what is meant by this'goodness'? - 'goodness' is the translation of the German term 'Pragnanz'. 'Goodness' says Koffka, embraces such properties as regularity, symmetry, simplicity"[3] and others which give "that kind of organization which is most orderly, most comprehensive, most stable, most free of the casual and the arbitrary; in a single word, that which is most good."[4] Thus the figure is said to be "pregnant" if it is regular, symmetrical and simple, in other words, if it is an appealing

---

(1) Hartmann, "Gestalt Psychology", 1935, P.184

(2) K. Koffka, "Principles of Gestalt Psychology", Harcourt, Brace and Company, New York, 1935, P.110

(3) Ibid. P.110

(4) Gardner Murphy, "Historical Introduction to Modern Psychology" Rev. Edition, Harcourt, Brace & Company, New York, 1949, P.289

whole. Hence, the tendency to overlook irregularities and complexities and to see a 'good' figure under the given conditions, is very strong in us. It was in this connection that Kohler said: "The principle contends that organization of a field tends to be as simple and clear as is compatible with the conditions given in each case."(1) Although this kind of pregnant organization may not take place directly and at once, e.g., as soon as the sensations are brought to the dynamism of the brain, yet the tendency, from the part of the 'Gestalten' to complete or to emphasise their natural form, persists as long as the field conditions permit. The state of rest or equilibrium cannot happen before the formation of that kind of 'good' organization. It should be obvious from the foregoing discussion that any state of rest or equilibrium is one and unique and it is particularly nearer to the ideal case than any other state which occurs prior to it. Kohler says:

> Every state of rest or stationary equilibrium, which occurs in nature is a unique case in contrast with the infinite manifold of other state.... A stationary state is reached when the energy of the structure as a whole has become as small as the given topography permits. Therefore, no matter what their dynamic route has been, all states which have occured prior to that of the invariable structure possess a greater energy than the and-state. (2)

Thus in the ideal stationary state, which occurs only in a passive and static environment - if such environment really exists - no energy is supposed to flow.

Before finishing with this law, let us note that some writers(3) consider the 'Law of Closure' as a special case of

---

(1) W. Kohler, "The Place of Value in a World of Fact", Horace Liveright, New York, 1938, P. 251

(2) Willis D. Ellis, "A Source Book of Gestal Psychology",1950,P.51

(3) Edwin G. Boring, "A History of Experimental Psychology", D.A. Appleton-century company, New York, 1939, third printing,P.579

of 'The Law of Pragnanz'. According to the notion of 'closure' the incomplete normal figures tend to complete themselves in some degree of 'goodness'. Both laws are fundamental and show clearly the progressive and dynamic side of the Gestalt psychology. "Pragnanz", says Boring, "is the dynamic attribute of self-fulfillment, intrinsic in all structured totals."(1)

5. Law of Figure and Ground: It was also derived from the experimental phenomenology of Wertheimer. This law states that our "visual perceptions, at least tend to divide into a figure with contour and a ground that is less objective in its character and is generally seen behind the figure"(2) In fact the phenomenon of figure and ground has gained more importance since the pioneer work of Edgar Rubin(3) in 1915. The dichotomous contrast or position involved in the figure-ground situation is fundamental to all experience. Hence the law is not confined to the visual perceptions. To hear my friend's voice who is addressing me, I must distinguish it from the other auditory stimuli which are present. The voice is the figure and the other auditory stimuli are the background. To "feel" an object with the skin it is necessary to separate the boundaries of cutaneous stimulation from those areas where no contact or different kind of contact occurs.(4) Furthermore the background influences the figure and from the interaction between the two our perceptions emerge. This will be

---

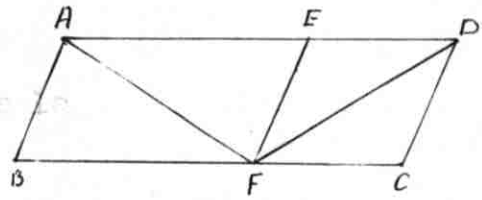
(1) Gardner Murphy, op.cit. P.289

(2) Edwin G. Boring, Ibid. p.579

(3) Edgar Rubin is a Danish Psychologist, was a protegé of Hoffding at Copenhagen.

(4) Hartmann, in the "Fourty-first Year book" Part II, "The Psychology of Learning". 1942, P.177

explained more clearly when we come to the next law namely "The Law of Membership Character". This is, however, very conspicuous in illusions where the strength of the field position appears clearly, as Hartman says. In fact let us consider Sander's famous parallelogram illusion.(1) which diagonal is longer FD or FA ? FA looks longer while, in fact, they are both equal in length. Why this illusion ? Because the observer is really comparing not two straight lines, but two areas ABFE and CDEF, since the former area is bigger its diagonal AF is seen as bigger. Thus the whole organized field is perceived and not just parts of it. If the triangle AFD is taken out of the complex, the two sides, that is the diagonals are more correctly appraised.



If we go back now to recall that the wholes are formed and organized according to different factors such as proximity and similarity, we can see that those factors, really, separate areas of different degrees of interval articulation. Let us add now that "the more highly articulated ones will become figures, the rest fusing together to form the ground."(2) when we look at any landscape photograph, we see mountains, trees, buildings and other shaped things, all appearing as figures against the sky which is the back-ground. Among these shaped things, the ones which have better shapes are bounded by better contours. This holds true not only in the realm of vision but in other areas as well. Koffka

---

(1) The figure and comments from ibid. P.177, (fig.5)

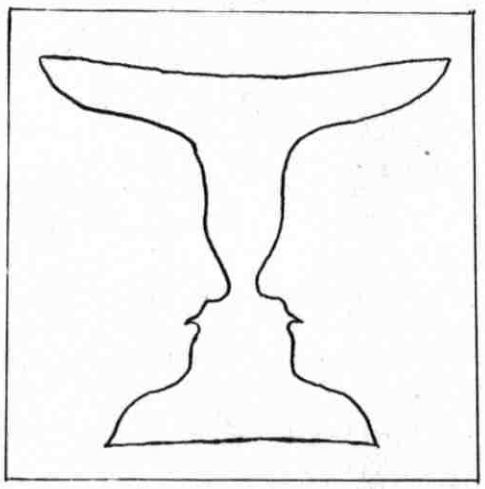
(2) K. Koffka, "Principles of Gestalt Psychology", 1935, P.209.

when dealing with infant's experience says:

> Crying and whining, which greatly vary in their expression, can be related to the phenomena of both ground and figure; the first in states like fatigue, hunger, and rest, the second with reference to unacceptable objects and localized pains. The early expression of contentment is obviously a pure ground-reaction, while the later-appearing smile is occasioned by a figure. Turning the head, pursing the lips, as well as eye-movements of fixation, can all be regarded as figure-reactions. (1)

In the illustration we have seen on page (84) about the simple pattern of taps, the groups of taps are the figures and the intervals of silence the ground.

There are, sometimes, cases in which the figure becomes a ground and vice-versa. This kind of experience is called 'reversible experience'. The following figures 1 & 2 are examples.(2)



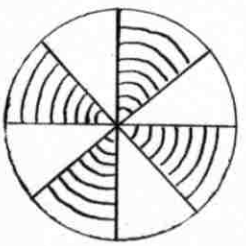


Fig. I

In the reversible figure (1) for instance one sees either a black Maltese (or German iron) cross or a white propeller. When the one is in the focus of consciousness the other is in the margin or ground and vice versa. The same may be said to figure (2) also,

---

(1) K. Koffka,"The Growth of The Mind", translated by Robert Morris Ogden, Second edition, revised, Harcourt,Brace and Company, New York, 1928, P.159

(2) For the explanation of this phenomenon and for further details see: Koffka, "Principles of Gestalt Psychology", 1935, PP.177-210. Fig (1) from page 194, & Fig (2) from Hartmann op.cit.1935

when the vase is in the focus the two profiles of two faces are in the margin or ground.

Before going to the next law, it is fair perhaps to raise the following question. How do we perceive the objects as "figures on grounds" ? In other words, what happens in the brain during this phenomenon ? Kohler answered this question by saying that there exists a difference of potential between each figure and its ground in the optic field. Thus a corresponding electromotive force in the nervous field takes place and gives rise to our perceptions. Here is how he put it in his article about the "Physical Gestalten" in 1920:

> So long, however, as there is differentiation in the visual field - e.g. that of figure and ground - there will be a corresponding electromotive force in the nervous field. Figure perception is represented in the optic field by differences of potential along the entire outline or border of the figure. (1)

Then he adds,

> Similarly, movements of the eyes are governed almost completely by the contours of the things seen, and every executed eye-movement is accompanied by a change in the locus of electromagnetic force. Likewise a visual object is a total form bounded by definite contours enclosing a surface and this whole is experienced as set off against the surroundings in which it occurs. The less this condition of 'being set off against' becomes, the less we are likely to consider the object a 'thing'. Along the boundaries of every perceived thing there arise electromotive forces in the optic sector of the nervous system. (2)

Thus the interpretation of the figure-ground phenomenon is seen in terms of interaction (flow of electromotive forces) between regions in the brain acting as figure and others acting as ground.

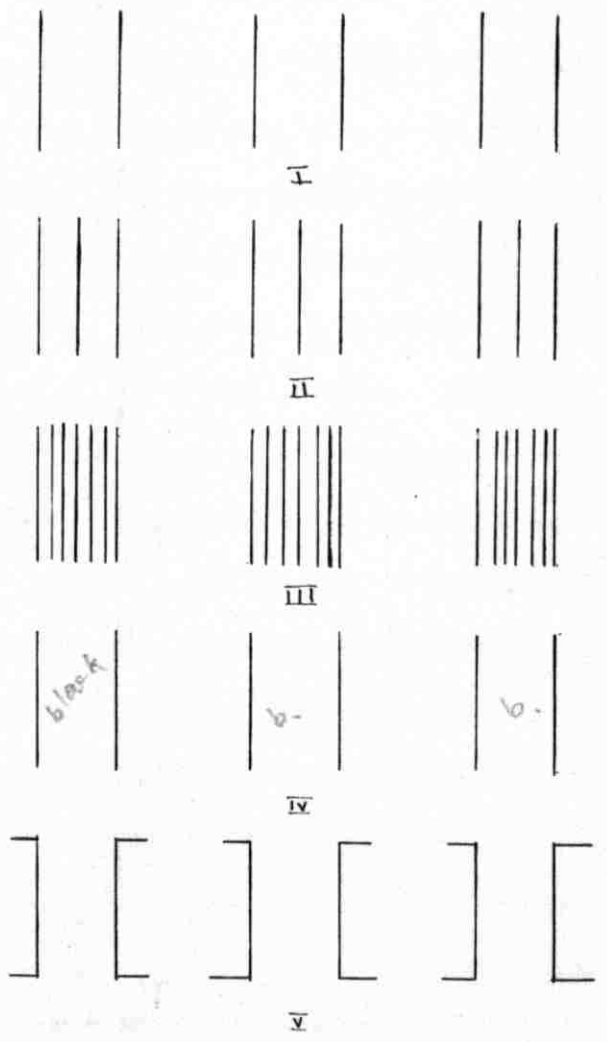
---

(1) Willis D. Ellis, "A Source Book of Gestal Psychology", 1950, P.23.

(2) Ibid. P.23

Now why do these electromotive forces arise along the boundaries of every perceived thing ? This happens because when the retina receives tow stimuli one from the thing itself and the other from the background which is less clear, less lighted & supposedly more homogeneous, a difference in potential takes place between the two retinal images and then an electromagnetic current flows. This current, says the French psychologist Guillaume, is measurable with a galvanometer.(1)

The following illustration, adapted from Aveling(2) may be useful to show many of the gestalt laws we have just seen. Look at these analogous lines. What do you see ? Three groups of lines, of course. Why do you see them grouped that way ? Is it not because the interval (Proximity) between each two groups is greater than that which is between each pair ? Let us now draw a third line within each pair of lines, the discrimination of each pair or rather the segregation of each pair from



(1) Paul Guillaume, "La Psychologie De La Forme", Ernest Flammarion Paris, 1937, P.42

(2) Francis Aveling, "Psychology, The Changing Outlook", the Arabic translation by M.J. Ismail and A.M. Hanna, Annahda-Almisriyyeh Library, 1949, PP 69 - 72.

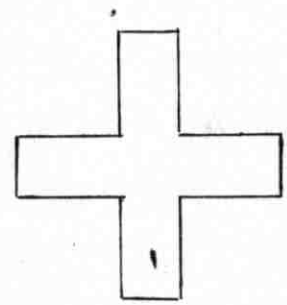
the others is more pronounced (Pragnanz). This discrimination will be more obvious if we add more and more lines, until we reach a final state in which every group will appear to be compatible and so complete that it will stands out as a figure against a background (figure-ground). But instead of adding parallel lines to the first groups, we add small lines to each pair in the outside direction, so to have right angles (fig. V) the pairs looks as if they are going away from each other and new forms evolve, as if they are shouting complete me! make me closed! (closure).

6. Law of Membership character: This law may be stated somewhat as follows: "the attributes or aspects of the component parts, in so far as they can be defined, are defined by their relations to the system as a whole in which they are functioning."(1) The tones in a melody do not have their fixed qualities to which a form quality is somehow added as Von Ehrenfels said. This is not the case, says Werthéimer, because each such tone manifests qualities which depend upon the place of the tone in the context. The tone in the melody has become entirely different from what it was before. This is a basic difference between Ehrenfel's position and that of Wertheimer. The'gestalt qualitat' must be presupposed said Ehrenfels. Thus he remained elementaristic in his thinking and all his contribution lies in the idea of gestalt-qualitat, which although inconsistant with the configurationism

---

(1) G. Murphy, "Historical Introduction to Modern Psychology", 1949, P.288.

seems to be a necessary step toward the new school. It was in the right direction, at least because it robbed the elements their sovereignity and gave it to the gestalt-qualitat. If a melody consisting of six tones is reproduced and recognized when six utterly different notes are played, the six elements, says Ehrenfels, are surely present, but in addition thereto one must presuppose a seventh, the so-called gestalt qualitat. It is this seventh datum which makes possible the recognition of the melody. As to the new configurationism, the flesh and blood of a single tone is dependent upon its rôle in the melody.(1) The same, of course is true in the visual perception. The following experiment demostrates the fact: Fixate, in a fair light, for twenty seconds a red cross on a grey field. According to the dynamics of contrast, the border of the cross will appear green; this is because red and greed are complementary colors. Now, cut out a tiny notch in one of the arms of the cross. What color we shall see in the space within the notch ? The traditional elementarist theory says: the color we shall see is green for the space in the notch is a part of the gray border which must take on a contras-



---

(1) Hartmann, "Gestalt Psychology", 1935, P.63.

ting line. But this is not true. The laboratory demonstration belies this prediction and agrees with the gestaltist's prediction which says that the color we shall see is red, for the cross is an organized whole which forces the component materials within it, as a result of membership character, to take on the attributes supporting the structure.(1) Thus every member part will give his existance and renders his identity to preserve the structure and character of the whole.

7. Law of Past Experience or Habit: This law states "if AB and C but not BC have become habitual (or 'associated') there is then a tendency for ABC to appear as AB/C."(2) In the constellation of dots, for instance, if some dots make up an outline of a familiar figure, this figure is easily seen. In fact, this law seems to belong to a non-gestalt category; it, rather, belongs to the associationism. This law is characterised in that the parts are assumed to be independent and their arrangements are being determined by extrinsic circumstances (e.g. drill). This is true; Wertheimer himself, when he formulated this law knew that; "There can be no doubt", said he, "that some of our apprehensions are determined in this way. Often artitrary material can be arranged in arbitrary form and, after a sufficient drill, made habitual." (3) This shows clearly that J. Piaget 1936 in his book "La Naissance de l'Intelligence Chez l'Enfant" and E. Claparède in his article "La Genèse De l'Hypothèse"(4) were wrong when they

---

(1) G. Murphy, op.cit., PP. 288 - 289.

(2) Willis D. Ellis, op.cit., P. 86

(3) Ibid. P. 86

(4) E.Claparède, La Genèse De l'Hypothèse, Arch. de Psych.XXIV, 1934.

thought that the gestaltists deny the value of the acquired experience in the solution of new problems. What the gestaltists do is warn us not to overemphasize this factor of 'past experience' or 'familiarity' for we are much prone to explain every perception by it and neglect the essential factors in organization. They do not deny the influence of memory and habit in the solution of new problems but they limit these conceptions as we shall see later and understand them in a way different from that of the XIXth century.(1) Wertheimer in stating this law was aware of the difficulty it might give rise to if misinterpreted. "The difficulty" says he, "is, that many people are inclined to attribute to this principle the fundamental structure of all apprehension."(2) Past experience alone is not enough to apprehend everything adds he; every one of us is very familiar with W and M and yet we can not discern them in this figure I beside.(3) But here one might object by saying that although we are familiar with the two letters W and M, we are not accustomed to seeing them in the way they appear in the figure I; this is why this arrangement is dominant. This explanation is "false", says, Wertheimer. "At best", he adds, "this mode of approach could show only why the arrangement W - M is not seen; the positive side (e.g., why the fig.I is arranged as it is now) would

(I) 

(II)

---

(1) See, for details, Paul Guillaume, "La Psychologie De La Forme", 1937, PP. 221 - 222.

(2) Willis D. Ellis, op.cit. P.86

(3) Ibid. P.87

still be untouched. But apart from this, the objection is rendered impotent when we arrange (W,M) one above the other (fig.II) in a fashion quite unusual compared to that given in (fig.I)."[1] The same way, one can argue that although fig. I is equally unfamiliar yet it is comprehended. Thus, although something is comprehended through the "law of habit" we should be careful not to overemphasize it.

There are many more principles of gestalt such as the law of set or attitude, the law of uniform destiny or of common fate, the law of direction etc... which we will not take up here, due to limitations of space.[2]

All these laws show characteristics of wholes; fundamentally, there is the tendency for experiences to be "formed", for members to fall into groups, for incomplete figures to be completed and made more definite and precise, and finally for the total field to be organized or stratified into figure and background. Figures look more solid. Ground is simply empty space. There is always a process of interaction and dynamism at work. It is as if a process were working toward a state of equilibrium, a state in which forms reach the maximum of stability, and in which the total organization is most complete. [3] These laws and principles which have been brought out by the Gestalt psychology are considered to be very logical and reasonable ones, that is

---

(1) W.D. Ellis, op.cit., PP. 87 - 88.

(2) For further details see Kurt Gottschaldt "Gestalt Factors and Repetition" in two papers published in 1926 and 1929 in German Psychol. Forsh. or see W.D. Ellis PP. 109 - 135

(3) Edna Heidbreder, "Seven Psychologies", 1933, PP. 349 - 351.

why their discovery and comprehension of their dynamism were possible. They do not deal with infinite numbers of parts, but rather they are concerned with limited and determined wholes fixed and organizable. One can sense here some kind of natural determinism; well this is quite appropriate. Gestalt psychology, being an application of the field theory, in the last analysis proves to be built on a kind of determinism without which the formulation of predictive laws will be impossible. The laws and the so-called secrets of nature are there and they are all waiting for us to look for them and discover their organization. This is perhaps the first metaphysical assumption underlying the very essence of field theory. In this connection Brown says: "The whole argument as to whether the events of nature are determined or indeterminate seems to me a metaphysical one. I believe that in so far as we must accept a certain metaphysical bias we should believe metaphysically in determinism."(1) This view is perhaps more scientific and more progressive because much more phenomena are explained through it. Through this view which presuppose order and systematization in the world we are able to discover new realities and to see new relationships among them. The first step in perception, hold the gestalt psychologists, is not to create but to understand the natural order of things and to comprehend their significance. As our perception proceeds from the incomplete to the less incomplete, the forms also integrate gradually and shift from incomplete states to more complete ones.

---

(1) J.F. Brown, "Psychology and The Social Order", 1936, P.473.

There is always a continuous dynamical selection and consequently integration of these forms. Thus the whole universe is moving progressively ahead, toward an ever growing goal. It is, particularly this idea of dynamic goal, of organization and reorganization through filling the gaps and of continuous selection as a result of interaction with the field, which underly what K. Lewin calls "Topological approach" to which we turn in the following chapter.

C H A P T E R IV

Topological Psychology
or
Lewin's Field Theory

Kurt Lewin (1890-1947) began his psychological work as an associationist and was particularly interested in the study of will and motives. He taught at the university of Berlin where he had studied. And it was there that he met with Wertheimer and Kohler. He was convinced that the associationism needed some radical revision and that Gestalt theory was more satisfactory. He became later on an enthusiastic gestaltist and ended his psychological career by founding a closely related school known as "Topological or Field Psychology". In 1933 he left Germany and migrated to the States, where he remained for ten years as a professor of child psychology at the University of Iowa. Inspired by the new spirit of Gestalt psychology which is based on the field theory he devoted his activity to the study of the motivation of human behavior. Since any kind of behavior occurs in a psychological field, the study of this field has become imperative.

The Psychological Field Defined

J.F. Brown, a pupil of Lewin defines the psychological field as "a mathematical spatial construction to which all psychological behavior may be ordered. All psychological events (perception, emotion, learning) may be said to occur in the psychological field, just as electrical events occur in the electromagnetic field or events of free fall occur in the gravitational field."(1) Thus to study any psychological phenomenon one has to study the psychological field which is a "mathematical construct", e.g., the position of every point may be, more or less, precisely given in the field. The field according to Lewin(2) is either "unstructured" or "structured" or "infinitely structured". He calls it "unstructured" when it is impossible to give the position of points and to distinguish them. It is "structured" when one can distinguish larger region but not infinitely small regions within it. And when one can distinguish infinitely small regions or points within the field it is said to be "infinitely structured". This degree of structure refers to topological or non-metricised fields as we shall see.

Lewin was one of those psychologists who believed in the value of mathematics in the realm of psychology. To foster

---

(1) J.F.Brown, "Psychology & The Social Order", 1936, p. 487.

(2) Ibid, p. 489.

exact reasoning and precise method in dealing with problems of motivation and behavior, Lewin felt the need of some kind of mathematics. Every symbol used in mathematics must be carefully defined. Thus when one applies mathematics to concrete problems he must define his symbols both conceptually and operationally: conceptually by relating each symbol to another as to relate, for instance, need to vector; and operationally by showing how the facts underlying our concepts are to be observed and measured. Lewin wished to find a means which enables him to predict the individual's behavior in a concrete situation; in other words he wished to deal adequately with the "single case" in full concreteness and not with the "average" which is nothing but an abstraction. To do so and to explain satisfactorily the psychological events and consequently to predict them, Lewin says that we must know (in psychology as in every science) two main things: (1) "The general laws of the particular events, and (2) the momentary constitution of the whole situation".(1) This was, according to Lewin, the scientific approach. His problem was to find that kind of mathematics which enables him to fulfill his ambitions. Statistics, for instance, could not help much; the concept of the "average" offered by statistics forms only one side of the gap while the "single case" is the other side; bridging adequately this gap is the crucial problem. So,

---

(1) Hartmann, "Gestalt Psychology", 1935, p. 69, footnote.

Lewin investigated in the other branches of mathematics until he got the hunch that "the young mathematical discipline 'topology' might be of some help in making psychology a real science."(1) Being anxious to make psychology a real science, Lewin began studying topology and making use of its concepts "which soon appeared to be particularly fitted to the specific problems of psychology."(2) Yet Lewin did not use every concept in topology because he "found it both sufficient and more fruitful to refer to the most simple topological concepts only."(3) It is time now to see what is this topology he sought so long, and what does it consist of?

Topology

It has been defined as "the doctrine of those properties of a figure unaffected by any deformation without tearing or joining; the theory of invariants of the group of continuous transformations; analysis situs."(4) This means that if you so deforme a square as to make a triangle out of it the

---

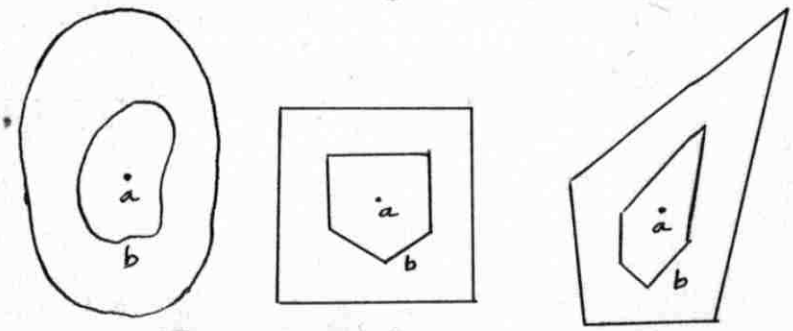
(1) Kurt Lewin, "Principles of Topological Psychology", translated by: Fritz Heider & Grace M. Heider, McGraw-Hill Book Co. Inc. New York & London, 1936, first edition, Preface-to Kohler.

(2) Ibid.

(3) K. Lewin, op. cit, Preface.

(4) Webster's New International Dictionary, Second edition, p. 2670.

properties of the deformed figure, e.g., the square are unchanged. Thus we can say that topology investigates the non-metrical and non-directional aspects of space; it investigates those spatial properties which are independent of metrics. "A circle, for instance, an ellipse, and any polygon are topologically equal. So are a cube, a sphere, and any closed three-dimentional figure."(1) "Topology becomes a metricized geometry", adds Brown, "when direction and magnitude of topological concepts are defined."(2) Therefore, topology is a part of geometry the subject of which differs from that of the ordinary geometry. Topology deals with the properties of figures which remain unchanged under continuous transformation; it deals with relationships of connection and position. If one draws any geometrical figureon a piece of dentist's rubber and one stretches the rubber in the plane, the figure undergoes point-to-point transformation, but inspite of this transformation there are certain positional relationships which remain constant. In the following figures, for instance, despite these transformations of the original figure A, the dot, (a) remains within the closed line (b), called (boundary).



C A B

---

(1) J.F. Brown, op. cit. p. 477.

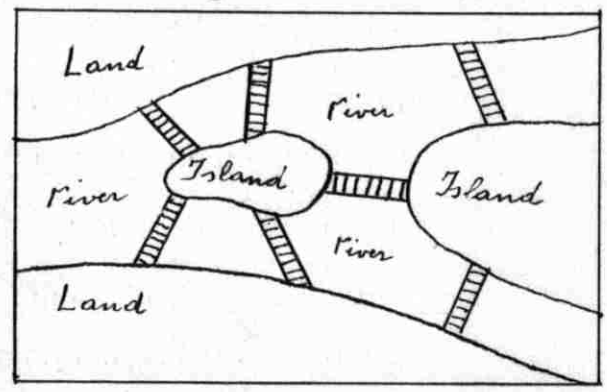
(2) Ibid, p. 477.

"The boundary in B is geometrically quite different from that in C but it still has the property of dividing the plane into two regions, an inner and an outer. To go to one from the other requires crossing the boundary."(1)

Thus Lewin has made a great use of these regions and boundaries when dealing with human behavior. But before stepping in the application of these concepts to psychology, I would like to go a little bit further in the history of topology, for neither this branch of geometry nor its application in psychology is sufficiently known in this part of the world.

The Story of Topology

Topology, as a branch of geometry, was first invented by the German philosopher Euler, who lived in St. Petersburg at the court of Catherine the Great. This invention was the result of the solution of a problem which arose in Konigsberg in Germany. Through this town the river Pregel twisted and seven bridges were built across In the midst of the river there were two islands connected together by one of those bridges (see the figure).(2) Four of them led from the opposite banks



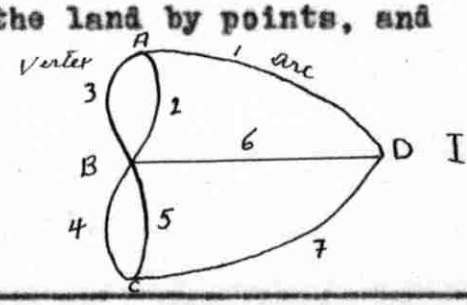
(1) The figures also from J.F. Brown, op. cit. p. 48.

(2) We rely in this part of the chapter 'Story of Topology' mainly

to one island, and other two joined the other island with the opposite banks of the mainland.

The problem arose this way: Some strollers over their beer steins inquired: "How can a Sunday afternoon stroller plan his walk so as to cross each of our seven bridges without recrossing any of them?(1)

This was the problem that reached Euler in St. Petersburg from his father-land. And it was in 1735 that Euler presented the solution before the Russian academy at St. Petersburg. What was the solution? Is the journey possible under the prescribed conditions? The solution was in the negative and the journey across the seven bridges, as demanded in the problem, was impossible; yet, curiously enough, this solution gave rise to what was called "Topology" or "Analysis Situs." History of inventions tells us that this was not the first time in which seemingly trivial problems have given rise to several mathematical or scientific theories. The probability theory rattled out of the dice cup of the young noblemen of France. Let us see now how the solution of this problem led to the new branch of geometry. In order to solve the problem Euler simplified it by representing the land by points, and the bridges by lines connecting these points; thus he got the following figure. Then the problem



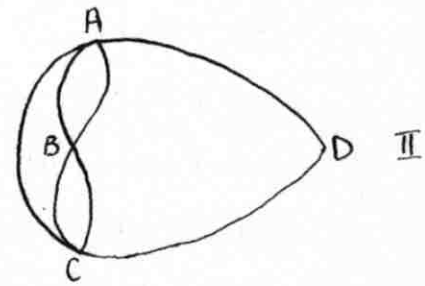
---

on: Edward Kasmer & James Newman "Mathematics & the imagination", Simon & Schuster, N.Y. 1940, (p. 266 - Fig. 83).

(1) Ibid, p. 265.

turned to be: "Is it possible to draw this figure with one continuous sweep of the pencil (i.e. without retracing any line or) without lifting it from the paper?"[1] This was the new form of the problem. Euler called the end points of the arcs 1, 2, 3, 4, 5, 6, 7 vertices (see the figure). A vertex is odd or even, according as the number of arcs forming the vertex is odd or even. The vertex A, for instance, is odd because the number of arcs 1, 2, and 3 forming it is odd. But suppose that the arc BD does not exist then the vertex B or D will be even because B is formed by the arcs 2, 3, 4, and 5 whose number is even, e.g., 4 and D is formed by the two arcs 1 and 7.

Euler discovered that one can pass through all the arcs exactly once, if the figure or the "graph" as he called it, contains only even vertices and this might be done by starting and finishing at the same point. He discovered also that if the graph contains at most two odd vertices, it may also be traversed, but it is not possible to return to the starting point. Thus in the previous figure if an additional arc AC is drawn from A to C, representing another bridge and the arc BD is removed, all the vertices become even and the graph can

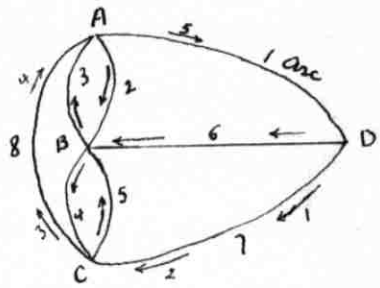


II

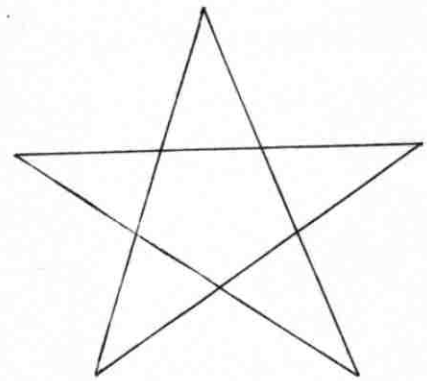
---

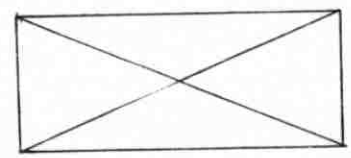
(1) E. Kasner & J. Newman, op. cit. p. 267. The figure also is adapted from fig. 84, p. 267.

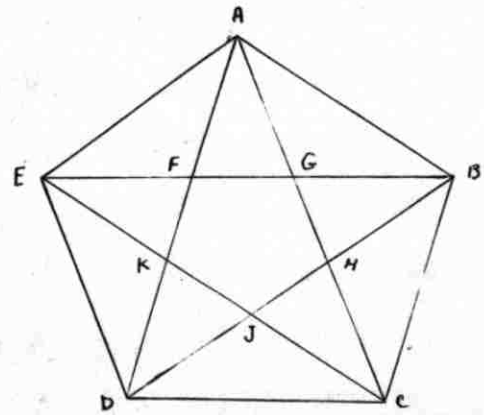
be traversed in a single journey (see figure II). But if the arc B D is kept, the stroller can traverse the bridges without being able to return to the starting point; if he starts at D he will finish at B and vice versa (fig. III). This is a general rule, says Euler. It applies to every figure under the same conditions. It is quite possible to traverse the following figure (star), for instance, returning to the starting point, without leaving the paper (fig. IV). As to this next figure, (fig. V)[1] it cannot be traversed with a single pencil stroke, for there are five vertices, four of which are the terminal points of three arcs, or of an odd order; thus one needs two journeys and not only one. This holds true also in the more complicated figures. This pentagon far more complicated in appearance, can be traversed in a single journey in the following order: A B C D E F G B H J D K F A G H C J K E A.[2]



III


IV


V



VI

---

(1) E. Kasner & J. Newman, op.cit., P.269

(2) Ibid, p. 269, fig. 88.

Thus, it is more obvious now that Euler did much more than merely solve a puzzling problem. He recognized the existence of new fundamental properties of geometric figures. These properties are independent of size or shape; they are functions solely of the general position of the lines and points of a figure. On any line ABC, for instance, the fact that B lies between A and C is just as important as the fact that the line ABC is straight or curved or has a certain length. The position of B between the two points A and C is the fact to be considered here.

Likewise, in the triangle beside (fig. VII) the interior point A is connected with a point B outside; the line joining them must cut one side of the triangle. This fact is just as important here as that the angles of a triangle equal 180^{0}. Thus topology - the study of such properties which remain unaffected when the figure is distorted - is distinguished from the metric geometries of Euclid, Lobachevesky, Riemann, etc., which treat of lengths and angles. In topology, say Kasner and Newman, we never ask "how long?", "how far?", "how big?" We rather ask "where?", "between what?", "inside or outside?" "A traveler on a strange road", they add, "wouldn't ask 'how far is the Jones farm?" if he didn't know the direction; for the answer

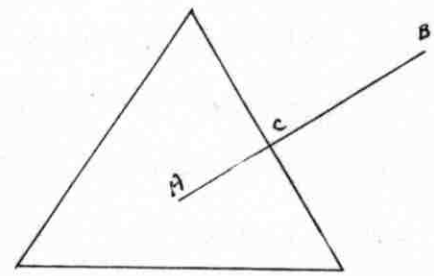


Fig. VII

'Seven miles from here' would not help him. He is more likely to inquire, 'How do I get to the Jones farm?'. Then an answer like, 'Follow this road till you come to a fork, then turn to your right', will tell him just what he wants to know."(1)

Topology, we repeat, is a non-quantitative geometry. "Its propositions would be as true of figures made of rubber as of the ordinary rigid figures encountered in metric geometry. For that reason it has been picturesquely named Rubber-Sheet Geometry."(2)

Mathematicians usually say that the 18th century had been devoted to the calculus and to analysis, but the 19th century in large part to geometry. Consequently topology received its share of attention. As a matter of fact, listing the German mathematicians published in 1847 the first systematic treatise on topology.(3) This science was not confined to the German learneds, of course. The French Poincare, the Dutchman L.J. Brouwer and the Japanese Yoneyama, as well as many other mathematicians were interested in this new science.

The famous French mathematician Jordan brought up a theorem which states: "Every closed curve in the plane which does not cross itself divides the plane into one inside and one outside." The curve which divides the plane into one inside and

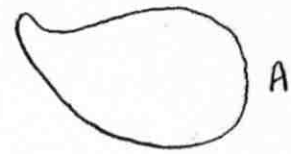
---

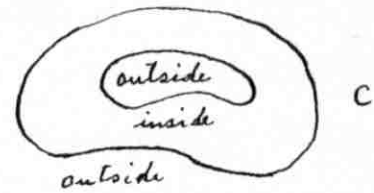
(1) E. Kasner & J. Newman, op. cit. p. 270-272.

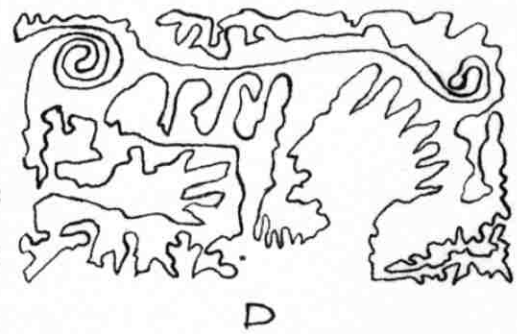
(2) Ibid.

(3) The treatise was entitled, "Vor Studien zur Topologie."

one outside is called simple, like the curve A beside. The curves B and C are not simple curves. This is easy to recognize, of course, but it is not so easy to believe that the figure D may be regarded as a deformed circle. This might be demonstrated easily by a piece of string or a rubber band, for it could be transformed into a circle merely by smoothing out the twists and links. Thus a circle is thought of as a curve which has this fundamental property of dividing the entire plane into one inside and one outside. Hence, says Jordan, "Every simple curve in the plane is topologically equivalent to a circle."(1) This property applies also, in a similar way, to the three-dimentional figures. "In three dimensions any simply-connected surface is the equivalent of a sphere."(2) But what is meant by "simply-connected"? By simply connected is meant that the object has a boundary which consists of one curve like the figure E. While a doughnut, for instance, (fig. F) is not simply-





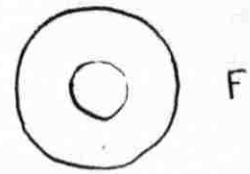


---

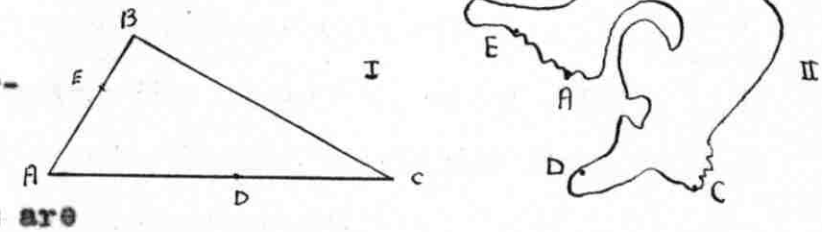
(1) E. Kasner & Newman, op. cit. p. 278.

(2) Ibid, p. 282.

connected and unless it is cut, it cannot be transformed into a sphere. Thus by a gradual deformation without tearing, any simply-connected three-dimentional object can actually be transformed into a sphere.



We can conclude now that topology is concerned with those properties of spaces, or their configurations, invariant under continuous one-to-one transformation. Topology studies "the position and relation of the parts of a figure to each other without regard to shape or size."(1) Thus the following two figures I, II are topologically equal and figure II is a perfect copy of figure I; but the triangle lines are curved, the angles changed and distorted and the length of sides altered. Nevertheless, there remain geometric properties common to both figures. The unaffected properties are what is called invariants.



Topology in Psychology

So far we have been dealing with topology as such. It is time now to turn to the application and use of this science

---

(1) E. Kasner & Newman, op. cit. p. 272. Figures I and II are adapted from figures 91 and 92, pp. 273, 274.

in the field of psychology. But, before doing so, it seems to be worth while to mention, how Brown justifies the adoption of topology in psychology in saying that since topology is the science of positional relationships and "since relational thinking tends to structure itself in terms of spatial relationships, topology gives us the mathematics necessary to set up theories about psychological problems where fundamental measurement is impossible at the present time."(1) Once adopted in psychology, topology, says Brown, might be defined for psychological purposes as "the science which investigates the 'belongingness' of spatial regions and their connectivity with other regions."(2) As a matter of fact psychological topology is based on three major postulates which are:

1. Existence of a psychological field the characteristics of which will be discussed later.
2. A dynamic force of behavior, e.g., due to the difference in potential in the field the behavior of any person follows a rate, an intensity and a direction determined by the field, in order to restore the equilibrium or to render the difference of potential to a minimum.
3. Existence of a vector, but behavior does not depend on the vector alone. There are other factors such as fluidity of the field, permeability of the boundaries, etc...

---

(1) J.F. Brown, "Psychology & The Social Order," 1936, p. 49.

(2) Ibid.

The rat in the maze is not free to go wherever his "desires" take him, nor is the individual solving a problem able to do so through his wishes alone.(1)

In the light of what we have said let us try to see how does topological psychology study the behavior and conceive the development.(2)

Behavior and Development
As A Function of The Total Situation

According to Lewin the "basic formula for behavior" is: Stimulus and Situation. By stimulus he does not mean, of course, only one particular stimulus but rather a "stimulus constellation." By situation he means the state of the particular person at that time. Thus, in general terms, the behavior "B" is a function "F" of the person "P" and of his environment "E", or as Lewin writes it:

$$B = F(P, E)$$

Every time we look at this general formula we should remember that the state of "P" and that of his "E" are not independent of each other; they affect each other. Let us

---

(1) J.F. Brown, op. cit. pp. 478-479.

(2) In doing so, we are relying mostly on K. Lewin's chapter 16 in: "Manual of Child Psychology", edited by Leonard Carmichael, John Willey & Sons, Inc., New York, 1946.

keep in mind that each person has his own environment. There are no identical physical or social surroundings to two different persons. To the same environment, furthermore, the same person react differently when he is sick or healthy, hungry or satiated, full of energy or fatigued. Therefore the environment is a function of the person or

$$E = F(P)$$

The reverse is also true the person is also a function of the environment or

$$P = F(E)$$

The state of a child in a democratic group atmosphere differs from his state in an autocratic group atmosphere.

From what has been said, we can conclude that to understand or to predict behavior, the person and his environment have to be considered as one "constellation" of interdependent factors. Lewin calls these factors in whole the "life space" or (L Sp) of that individual. Therefore we can write $B = F(P, E) = F(L\ Sp)$

Thus the life space includes both the individual and his psychological environment; in other words it denotes the "totality of facts which determine the behavior (B) of an individual at a certain moment. It represents the totality of possible events... it can be represented by a finitely structured space."(1) This, in fact, limits the problem of

---

(1) Kurt Lewin, "Principles of Topological Psychology", trans. by: Fritz Heider & Grace Heider, McGraw-Hill Book Company, Inc. 1936, p. 216.

behavior, but the question which is liable to occur here is "How could this help us in explaining and predicting behavior?" To be able to do so, Lewin answers, we have to:

1. Find a scientific representation of (L Sp), and
2. Determine the function (F) which links the behavior to the (L Sp). This function (F), adds Lewin, is what is usually called a "law".

Now, since (L Sp) is a totality of coexisting facts which are mutually interdependent, therefore, they can be conceived as a field. Hence the person and his psychological environment included in the (L Sp) should be viewed as a field. The problem is now "how to represent scientifically this field?" To do so, Lewin says, that some principles should be remembered:

1. <u>Objectivity:</u>

That is to represent the field exactly as it exists for the individual in that particular time. Knowing of physical and social conditions also are of great importance because they limit the variety of possible life-spaces.

2. <u>Consideration of:</u>

(1) Specific items as: particular goals, stimuli, needs, social relations, etc. ..

(2) General characteristics of the field as: atmosphere or amount of freedom.

(3) Everything which affects behavior at a given

time; this should be represented in the field existing at that time. Only facts that can affect behavior should be parts of the present field.

3. Mathematical Representation

Finally, all we need is a mathematical representation of the psychological field and the equations expressing the psychological laws.

To have laws, it should be clear, theories are unavoidable; otherwise it is impossible, says Lewin, to proceed beyond collection and description of facts. This idea is not new, of course; the terms need, association, conditioned reflex, Gestalt, libido, etc., are, says Lewin, examples of theoretical constructs to characterize certain dynamical or genotypical facts. But here again a problem arises from the controversy between laws and individual differences. Laws are general while individual differences are specific. But Lewin says that "a law is expressed in an equation which relates certain variables. Individual differences have to be conceived of as specific values which these variables have in a particular case."(1) Thus according to Lewin, general laws and individual differences are two aspects of one problem; they are mutually dependent upon each other and the study of one cannot proceed without the study of the other.

---

(1) Leonard Carmichael, op. cit., p. 794.

Lewin, however, likens this to any other similar situation in every science. Physics, for instance, deals with the ion, atom, molecule, and up to units of the size of the star. It goes without saying that the attempt to determine reliably large microscopic units by observing microscopic units is not the right way in any science. "It is technically impossible", says Lewin, "to describe the movement of the sun by describing the movement of every ion contained in it."(1) This holds true for psychology also as it was shown in the previous chapters.

Some Basic Constructs

Let us see now what are some of those basic constructs Lewin has formulated in order to represent the psychological field:

1. Psychological Force

First among them is "psychological forces" such as drive, excitatory tendency or "the tendency to act in a certain direction." The term force is defined as the "cause of change; a basic concept of vector psychology. Properties of a force are: strength, direction, and point of application. Strength and direction can be represented by a vector."(2)

---

(1) Leonard Carmichael, op. cit, 1946, p. 795.

(2) K. Lewin, "Principles of Topological Psychology", 1936, p. 218.

2. Psychological Position

The position of the person within the total psychological field and the position of the other parts of the field in relation to one another are of prime importance. Lewin agrees that it is not possible today to measure psychological distance or direction quantitatively. Yet he believes that some problems of position can be treated by means of that qualitative geometry called topology.

3. Potency of a Situation

This refers to the weight which a certain area of the life space has for an individual relative to other areas. In other words, it refers to the degree of belongingness to two or more groups, for instance.

These three basic constructs are not rigid nor fixed. Hence the field or the life space is dynamic also. One should always be aware of the fact that differentiation of all sorts can occur in the various dimensions of the life space, such as reality - irreality dimension, psychological past and psychological future, etc...

Now according to Lewin, the first prerequisite for understanding behavior, is the determination of the position of the person within the life space. The region[1] in which

---

(1) "Part of the life space ... A region is not necessarily a connected one." Op. cit. 217.

a person is located determines:

1. The quality of his immediate surroundings
2. What kinds of regions are adjacent to the present region and what possibilities has the individual for his next step.
3. What step is toward or away from his goal.

Thus most behavior may be looked upon as a change of position or as a locomotion of the person. There are, however, cases of behavior which may be conceived as change of structure; this is the case of adaptation to a new situation. By structure of the life space, is meant the positional relations of its parts.

Change In Cognitive Structure of a Situation (1)

According to Lewin, the infinite variety of changes in structure may be classified roughly into:

1. An increase in the differentiation of a region, e.g., increase in the number of subregions.
2. A combination of separated regions into one differentiated region.
3. A decrease in differentiation, e.g., a decrease in number of subregions within a region. This is the opposite of the first item.

---

(1) Cognitive structure = "structure of the life space corresponding to the knowledge of the person." Op.cit. p. 218.

4. A breaking up of a whole, that is, previously connected subparts of a region are separated into relatively independent regions.
5. A reconstructing, e.g., a change in pattern without increase or decrease of differentiation. This is what happens in the phenomena of detour and insight.

These are the five categories of changes in the cognitive structure. The reader is expected here to ask what evoque these changes? What is the cause of the tendency to change or to move? To these questions Lewin answers that "the construct force" evoque the changes. He adds also that whenever a resultant force (different from zero) exists, there is either a locomotion in the direction of that force or a change in cognitive structure equivalent to this locomotion.

Here Lewin introduces another concept, that of "valence".[1] If the goal (G) is attractive to the person, it is said to have a positive valence $[Va\ (G) > 0]$ and vice versa. But sometimes, although the goal has a positive valence one cannot reach it because of some resistance coming from what Lewin calls "Restraining forces". Actually, he distinguishes between four types of forces.

---

(1) "A valence corresponds to a field of forces whose structure is that of a central field. One can distinguish positive and negative valences". Op. cit. p. 218.

Types of Forces

1. Driving Force

The first type is that called "driving force" which may be positive or negative, e.g., to the goal or away from it. This kind of force, however, leads to locomotion.

2. Restraining force

This does not lead to locomotion but influences the effect of driving force, as we have just seen.

3. Induced force

This is the type of force which does not correspond to the individual's own wishes but to another's, to one's mother's wishes, for instance.

4. Impersonal force

This does not correspond neither to one's own wishes nor to another person's; it is impersonal.

Conflict Situations

These forces usually interact; they help each other or they contradict each other. A "conflict situation" arises when forces acting on the person are opposite in direction and about equal in strength. Lewin, distinguishes between three types of situations:

a) When a person stands between two positive valences; this is called "approach-approach". This may be illustrated in the case the child (c) has to choose between going on a picnic (P) and playing (Pl) with his comrades. (fig. a) The decision in this type of conflict is relatively easy.

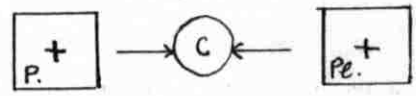


Fig. a

b) Sometimes the child faces a situation that has simultaneously both a positive and a negative valence; this is called "approach avoidance". This is the case of the child who wishes to climb a tree (Tr), but is afraid.

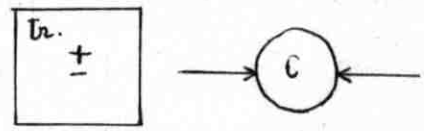


Fig. b

c) As to the third type of conflict situation, this occurs when the child stands between two negative valences, for example, when he has to do a task (T) he does not like, otherwise he will receive a punishment (P) (fig. c). This type is called avoidance-avoidance. The choice here is more difficult of course.

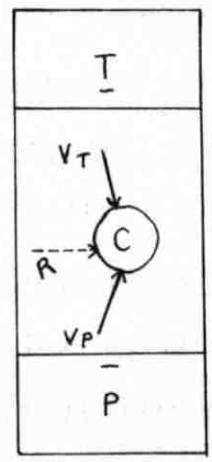


Fig. c

---

(1) The three figures a, b, and c are taken from K. Lewin's "A Dynamic Theory of Personality." Translated by Donald K. Adams and Karl E. Zener, McGraw-Hill Book Company, Inc. New York, 1935, pp. 89-91.

Decision

The person being into the process of making a decision or a choice usually alternates between seeing himself in a future situation corresponding to the one and to the other possibility. When a decision is reached, one of these possibilities acquires the dominant potency permanently. In fact the decision time increases in the following cases:

a) When the opposing forces are equal in strength

b) It increases with the importance of the decision; in other words with the (Valence of the goal).

c) It increases with the intensity of the conflict

d) It is longer with two negative valences than with two positive ones.

e) It shows great individual variations. However, says Lewin, extreme decision - retardation is typical of certain types of depression.

In every conflict situation there is an emotional tension. This tension, says Lewin, seems to be a function of the strength of opposing forces. Furthermore, one of the simplest expressions of emotionality is restless, or movements which are not directed to a certain goal. The field of the person is changed and tries to attain a degree of equilibrium.

Factors Determining The Field and Its Changes

a. Need and Valence

The child's needs change and they change constantly in their intensity and differentiation. Thus, Lewin says that they have the character of "organizing" behavior. Needs and valences, adds Lewin, are closely related; thus an increase in the intensity of need for recreation, leads to an increase of the positive valence of certain activities (such as going to the movies), and to an increase in the negative valence of certain other activities (such as doing hard work). Furthermore, as a result of the increase in positive valence which accompanies the state of hunger of a particular need, areas of activities which are negative or on a zero level, when the need is satiated, acquire a positive valence. The hungrier person is usually satisfied with poorer food.

b. Need & Cognitive Structure

Need therefore is an important factor in the determination of the field. Our perception and our life space are influenced also by the state of the needs. Stern & MacDonald in 1937 found that pictures without definite meanings will be seen according to the mood of the child. However, the effect of the need upon the cognitive structure is proportional to the need intensity and to fluidity[1] of the related regions

(1) Fluidity: "The smaller the forces necessary (other conditions being equal) to produce a certain change, the more fluid a thing or midium is. The fluidity of the same region can be different for different kinds of influences." From K. Lewin, "Principles of Topological Psychology", 1936, p. 218.

in the structure.[1]

c. Changes of Needs & Goals

"Needs", says Lewin, "may be changed by changes in any part of the psychological environment, by changes of the inner-personal regions, by changes on the reality level as well as on the irreality (for instance, by a change in hope), and by changes in the cognitive structure of the psychological future and of psychological past. This is well in line" adds Lewin, "with the fact that the total life space of a person has to be considered as one connected field."[2]

Before leaving this part of the chapter it is fair to know what does Lewin mean by such phrases as "inner-personal regions", "reality and irreality levels". Just like the psychological or social fields contain regions, thus "the use of space-like concepts has likewise proved unavoidable for the psychological representation of the person", says Lewin. "Dynamically", Lewin adds, "the person appears as a 'stratified' system which has a definite structure and in which one can distinguish central and peripheral regions."[3] In problems like decision, intention, memory, emotion, etc., it is of great significance, believes Lewin, to know whether the corresponding processes belong to "central" or "peripheral" regions.

---

(1) Leonard Carmichael, 1946, op. cit. p. 819.

(2) Ibid, p. 824.

(3) K. Lewin, "Principles of Topological Psychology", 1936, p.50.

As for the reality-irreality, Lewin distinguishes mainly two levels in the life space and they may be represented by two parallel planes, the one is called the reality level and the other the irreality level. Both levels are graded so that some degrees of reality or irreality are distinguished in these levels. "A day dream, a vague hope, has in general less reality than an action; an action sometimes has more reality than speech, a perception more than an image ...(also) planned consideration of the ways and means which lead to a certain goal (is distinguished) from free play of phantasy, which is more irreal."(1) Lewin says that he found necessary to use such a dimension in his topological psychology in order to be able to account for locomotion in the life space.(2)

So much for an introduction to a theoretical part of Topological psychology. Our task will be more useful if we turn now to a practical social problem which has been studied topologically by Lewin. This problem is that of "Jewish Minority" in Germany particularly. This is a socio-psychological problem. We have already said that topology is mainly sociological, so no wonder that we chose this particular problem out of the many problems Lewin studied. On the other hand, Lewin, being himself a jew and probably a Zionist, it is interesting to see him dealing with such a question. Further-

---

(1) K. Lewin,"Principles of Topological Psychology", 1936, p. 196.

(2) For further details of reality-irreality dimension see pp. 193-205, ibid.

more, modern Gestalt psychologists emphasize more and more social psychology to the extent that some of them say that it is the only useful branch of psychology and the more comprehensive. Here is what wheeler, for instance, says: "Social psychology (is the) study of the individual personality and its behavior in relation to social groups."(1) After defining it he adds: "Social psychology is the foundation of all the social sciences. Political science, economics, sociology, interpretative history, and cultural anthropology are all studies of human behavior in different types of situations, as human beings strive to reach various types of goals. The laws of these different social sciences are fundamentally psychological laws; at least they grow out of psychological laws. They are laws pertaining to human behavior, when human beings are organized in groups."(2)

Certain psychologists, however, are resistant to certain of Lewin's formulations, but almost the majority accept the following concepts as "standard household implements in psychological work" as says Gordon W. Allport:(3) Barrier, detour, level of aspiration, central regions of personality, rigidity, group atmosphere, group decision. Lewin, actually,

---

(1) Raymond Holder Wheeler, "The Science of Psychology", 2nd edition, Thomas Y. Crowell Company, 1940, New York, p. 5.

(2) Ibid, p. 6.

(3) K. Levin, "Resolving Social Conflicts", edited by Gertrud Weiss Lewin, Forward by Gordon W. Allport, Harper & Bros. Publishers, New York, 1948, p. IX. It is on this book mainly that we shall rely in the remaining section of this chapter.

believes in the possibilities of experimentation in biological sciences, even in sociology. "I am persuaded", says he, "that it is possible to undertake experiments in sociology which have as much right to be called scientific experiments as those in physics and chemistry."(1) It is in this optimistic attitude that he studied the Jewish minority problems, from a psycho-sociological stand point.

According to Lewin "One of the most important constituents of the ground on which the individual stands is the social group to which he 'belongs.'"(2) At the beginning when the child is growing, the family group will form his ground. Later on when he grows older he will belong to more than one group, e.g., playmates, club members, class mates, etc... "The instability of the background in childhood may lead", says Lewin, "to an instability of the adult."(3) The individual cannot be secured unless he has a clear awareness about his belonging or not belonging to a group. Otherwise he will undergo strong conflict and frustration. In most of the life situations the adult acts not purely as an individual but as a member of a social group. The natural thing about the adult is to belong to different groups. His belonging to one group might be more important, in a given moment, than his belonging to another group. In one situation he may feel and act as

(1) K. Lewin, "Resolving Social Conflicts", Harper & Bros., New York, 1948, p. X.

(2) Ibid, pp. 145-146.

(3) Ibid, p. 146.

belonging to his political group; in other situations he may feel and act as a member of family, religious, or business group. Nevertheless in every situation, says Lewin, "the person seems to know what group he belongs to and to what group he does not belong to."(1) It is the clarity of this knowing and his position inside or outside of the group that determine his behavior. Lewin represents in the following topological scheme the fact of belonging to many social groups: A person (p), for instance, may belong economically to the upper middle class (u MCl). He may be a member of a small family (F) which is part of a larger family group (l F). This larger family group the third American generation of Irish ancestry (I 3G). Politically the person may be a Republican (Rep.) He may be the Secretary of the Northeastern Division of Elks (E). In this(figure I) the group to which the person belongs is represented as a "region" of which the person is a part. The other groups may be subgroups, e.g. F is a subgroup of (lF) or both groups may overlap, e.g. (lF) and (E).

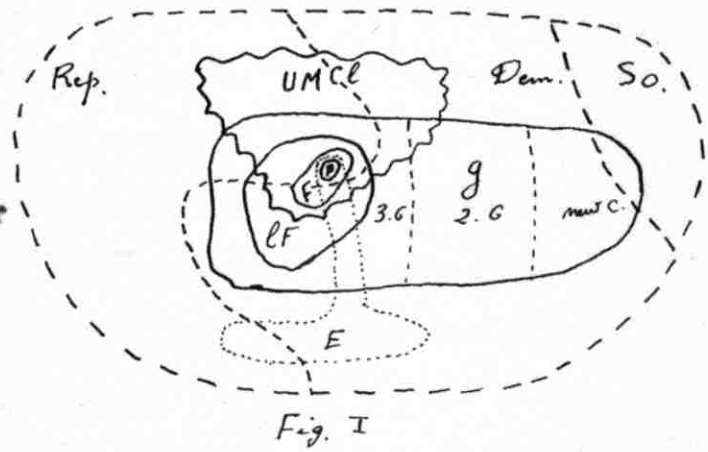


Fig. I

What is important, therefore, is that sense of

---

(1) The figure is taken from Kurt Lewin, "Resolving Social Conflict", Op. cit., 1948, p. 147, fig. XX.

belonging. There are occasions when the belonging of a person to a group is doubtful or not clear. This is the case of the person entering a gathering or of a newcomer in a club. The behavior of both persons are characterized by uncertainty and they do not feel at home at the beginning; "they are self-conscious, inhibited, or inclined to overact."(1) This is because the individuals in these two examples are crossing the "margin" of one group into another.

This state of uncertainty and self-consciousness may characterize the whole life-situation of many persons; they remain standing near a margin of groups. The state of the "nouveaux riches" or other persons crossing the margin of social classes, are typical illustrations. This is also the state of minority members when they try to enter the main group.

Crossing the margin is a very difficult task for two main reasons. First, because those who are crossing the margin are not sure of their belonging to the group they are ready to enter. Secondly, because they are not sure also about their belonging to the group they are leaving. Thus those persons are almost lost just like the adolescent who does not know yet whether he belongs to the world of adults or to that of children.

In the light of these premises, Lewin, studies the

---

(1) Kurt Lewin, Op, cit. 1948, p. 147.

Jewish minority problems. He distinguishes between two periods namely, the "Ghetto" and "modern times" or "emancipation". "The strength and the character of the boundary of the Jewish group has changed a great deal in the course of history,"[1] says Lewin. The boundaries between the Jewish and non-Jewish groups were clear and strong; the Jews had to live in restricted territories and towns. Thus we can say that their "space of free movement" was narrow; their "bodily" as well as their "social" "locomotions" were strongly restricted. There were many occupations not open to Jews, says Lewin; so if we represent all possible occupations, proceeds he, as one totality of regions, the social space of free movement for the Jews is limited to comparatively few parts of this totality (fig. II)[2] in which J = Jewish group, NJ = non-Jewish group, B = barrier between Jewish and non-Jewish groups. K.L.M.N.O.... may represent geographical areas or occupational fields.

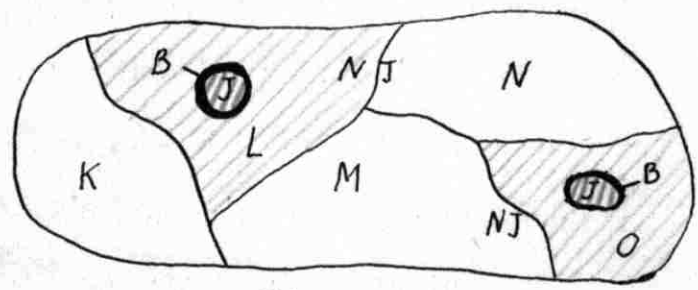


Fig II

Lewin, however, says that in the period of the Ghetto:
1. "The Jewish group was a compact group spacially and socially"[3]

---

(1) K. Lewin, op. cit. 1948, p. 149.

(2) This figure was adopted from K. Lewin, ibid, p. 150, fig. XXI.

(3) K. Lewin, op. cit. p. 150.

This group, says he, may be represented as one "connected region" or as few compact regions, rarely including foreign sections.

2. Every individual jew knew clearly that he belongs to the group. "A yellow badge imposed from without, or a particular form of behavior (as in dress or in speech) developed from within, made him easily recognizable by every one."(1) Thus his belongingness to the group was sure.
3. The boundary between the Jewish group and the non-Jewish group was characterised by being so strong it was almost impassable. Both groups do not allow transfer.
4. This situation had its effect on the life of the Jewish group; and this effect varied according to the sociological forces infringing upon the group. This strict limitation in the Ghetto period created in the individual as well as in the group a high tension which has been proved to hamper the psychological development. This state of affairs also makes the minority group more conservative and more rigid, because conservatism preserves the group intact. But on the other hand, it makes him retarded and stagnant.

Then Lewin turns on to the second period, namely the period of freedom and emancipation and compares the modern situation of the Jewish group as it was in Germany, for instance,

---

(1) K. Lewin, op. cit. p. 151.

before the first world war, with the Ghetto period we have just mentioned. Lewin says that:

1. In this period Jews were not compelled to live in special districts of the country, although they were, comparatively deliberately, concentrated in one part of the town. Moreover, they were more or less distributed all over the country. "Topologically", says Lewin, "one cannot represent the Jewish group at that time as one or a few connected regions, but rather as an unconnected region composed of many separated parts."(1) The region was no longer homogeneous (fig. III).(2)

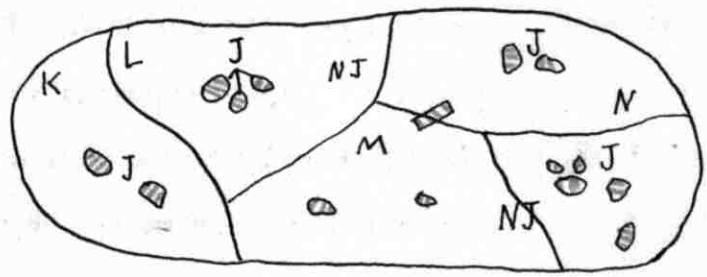


Fig. III

The same thing may be said as far as occupations are concerned. Although, traditionally, Jews were concentrating upon specific occupations, yet the other occupations were open to them in the second period. The topological structure of the occupational field would give a similar figure to that of geographical one (fig. III)

2. The wider distribution and looser connection of the parts of the Jewish group involved a change of the character of the boundary between the Jewish and non-Jewish groups.

---

(1) K. Levin, op. cit. 1948, p. 151.

(2) Ibid, Fig. XXII, p. 152.

The boundary is no more boundary by law, so although still existing, it lost considerably in strength and concreteness. At least some individuals could pass this boundary.

3. Inspite of the remaining restrictions, the space of free movement for social action had grown greater. The pressure from outside was much weaker; consequently a great deal of cultural development took place; the conservatism of the group lessened just like in any group trying to emancipate.
4. As the result of the weakening of boundary the contact between the Jewish and non-Jewish groups increased; this leads ultimately to the decrease of difference in character between them. No more yellow badge and the distinction of dress and habits nearly disappears.
5. Consequently, the tension under which this group lives has decreased for the space of free movement enlarged and the pressure from without weakened.

We can conclude that the individual Jew in modern times, stands by himself and becomes functionally more separated, he becomes to a higher degree "a separated whole". Here, Lewin observes very cleverly a very important social phenomenon, which usually occurs among Jews as individuals; it occurs also within any other oppressed minority. The lessening of the pressure against the Jews as a group did not provide an entire release from tension and real security in the life of the individual Jew. On the contrary, when the

pressure on the group decreased, that on the individual was relatively increased. In the period of the Ghetto, the individual beared the pressure as only a part of the group (fig. IV) while in the period of emancipation the "point of application" of the external forces shifted from the group to the individual (fig. V). [1] In the period of Ghetto, the individual was exposed to especially high pressure when acting outside the group. He had in the group a region of security where he felt "at home", and did not stand by himself. In the emancipation period the Jew has relatively more often to face as an individual the pressure against the Jews.

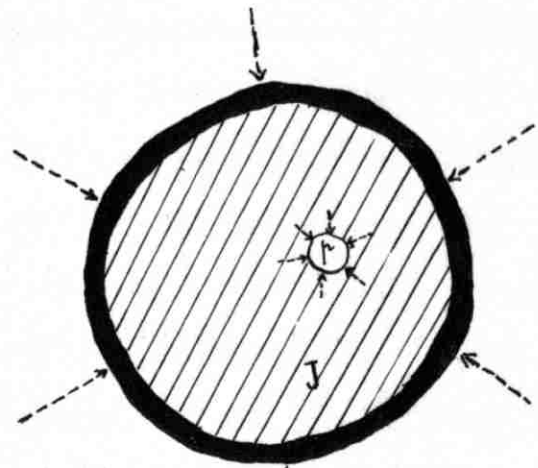


Fig. IV

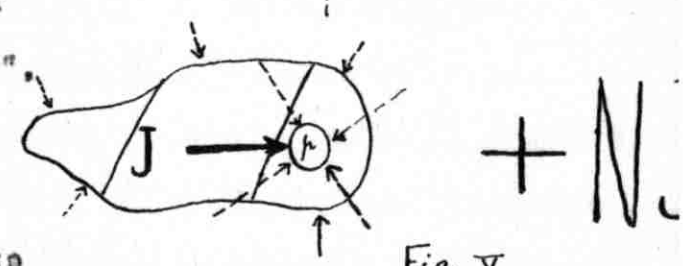


Fig. V

On the other hand, in the Ghetto period the boundary being too strong to be crossed and the region outside the group probably had no strong "positive valence" for the boundary of the non-jewish region is unpassable barrier also. There only

---

(1) K. Lewin, op. cit. 1948, p. 154, the symbols used in these two figures stand for: p = individual person. J = Jewish group. NJ = non-jewish group.
____ = force acting on the individual corresponding to his own desires.
---- = force acting on the individual, applied from without.
-.-.- = force applied to the group as such.

rare persons, if any, would wish to cross the boundary, toward the non-Jewish region, and even if such a wish existed it could only create dreams in the "level of irreality."

As to the free period, due to the manifold contacts between members of different groups the barriers lost their concreteness and strength and to many persons the idea of trying to cross the barrier and escape the oppression, occurs. "Every weakening of the boundary between his group and the other groups will increase the strength of the force in this direction."(1) Thus the more dissolution of the group takes place and the more the individual Jew approaches complete emancipation, the stronger the conflict he is facing will be. Solving of this conflict will determine his behavior.

This typical restless due to the strength of conflict, says Lewin, is responsible for the Jews industry and over-activity. Some of the best work of Jewish people in the last century, says Lewin, was partly due to this over-activity.

One should not conclude, that the Ghetto period is better than the full emancipation and equality. The problems of any minority should be humanly solved and cooperation and creativeness should be aimed at. Settling the Jews in Palestine as Lewin wished more than fifteen years ago should not be considered as a final solution to their psycho-sociological problems. The actual solution perhaps adds to their problems and

---

(1) K. Lewin, op. cit. p. 156.

to their uncertainty; they feel unsecure and their future depends mainly on the political events and changes.

This is not, however, the proper place to deal with political problems; so let us limit ourselves to our topic and conclude by saying that here is how Lewin applied concepts of topological psychology to psycho-sociological problems. He treated the group as a whole and the individuals as parts, and thus he was able to study their relationships and organizations. In the same way he studied the conflict in marriage and in industry, thus showing that the social problems, which have for a long time been considered as uneligible to be studied experimentally and scientifically, can be studied so and explained scientifically like any other problem. This does not mean, however, that Lewin's attempts to apply topology to psychology has received a unanimous agreement among psychologists. No doubt, that many of them share with Lewin the possibility of profiting from this branch of mathematics and many are enthusiastically in favor of it. On the other hand, there are persons who see in Lewin's attempts nothing but waste of time and triviality. Ivan D. London is, perhaps the representative of this point of view. He criticizes Lewin's topology, first as being different from that of mathematics. Lewin, says London, has not taken the whole system of topology but he has satisfied himself with some definitions "torn from the body of the enmeshing mathematical theory."(1) This fact, adds

---

(1) Ivan D. London, "Psychologist's Misuse of the Auxiliary

London make these definitions "unproductive of deducible conclusions.... The host of theorems that form the actual machinery of topology should have been made to function and so to take over the work of rigorous deduction. Lewin in reality does not utilize one single theorem of topology."(1) To support his viewpoint, London takes as example Newton and the calculus he borrowed for his mechanics, he says: "Newton, for example, in evolving his system of mechanics did not employ for the purpose a few isolated definitions from the calculus. He used the body and not just some of the root of that particular mathematical theory, so that by the whole application of the calculus, formula after formula methodically arises."(2) Finally London reaches the conclusion that "the coordinations between topology and psychological life-spaces have failed of their purpose, being not only imperfect, but in point of fact quite impossible."(3)

Let us stop here and restrain from going further in criticisms and answers to criticisms, because this is not our concern now. Although, I am not in a position to defend Lewin here, I feel that London's criticism of topological psychology

---

concepts of Physics and Mathematics", Reprinted from psychological Review, Vol. 51, No. 5, September, 1944, p. 287.

(1) Ibid.

(2) Ivan D. London, op. cit. p. 287.

(3) Ibid, p. 289.

is not all true. Lewin was after that type of mathematics which suits psychology more and which he sees more or less in topology. Now, should Lewin either make use of the whole system or leave the whole system as London suggests? Cannot scientific method allow Lewin to make some adaptation of topology? Is there any harm in doing so? Should we deprive Lewin from developing his own system to meet his aim? These are questions the discussion of which might lead us into the field of methodology and epistemology which is not our concern now. We can conclude, however, by saying with Lewin that the future and the future psychologists will judge his method and will show either its sterility or its usefulness.

C H A P T E R V

More Gestalt Contributions

After this long journey in the field of Gestalt Psychology it seems wise to stop for a while and have a general look at the ground we have covered. This perspective is perhaps necessary now, especially when we intend to cross the field of Gestalt psychology and step in the field of its implications.

Gestalt Psychology, as any other new movement, began as a revolt. It protested, we remember, against the then prevailing order in general. It concentrated its attack against elementarism, associationism, the elementary explanation of constancy hypothesis, the meaning theory, concept of attention; they described this concept of attention as "vague and meaningless" and as "a delusory means of escape from ignorance."(1) It protested also against "the conception of the nervous system as a mechanism of rigid arrangements in which definite and fixed pathways connect definite and fixed points."(2)

The new school protested against analysis or rather against reliance on analysis which gave rise to what was called

---

(1) Edwin G. Boring, "A History of Experimental Psychology," 1931, p. 578.

(2) Edna Heidbreder, "Seven Psychologies", 1933, p. 345.

the "bundle hypothesis", which was criticized by Wertheimer as we have seen. He maintained that "sensations, images, and feelings are but artificial elements of experience, and to put emphasis invariably upon this kind of analysis is to create an equally artificial psychology of compounds, mosaics, or 'bundles'."(1) However, this protest against analysis was misinterpreted by many psychologists and since it is a very important point having its bearing in the implications of Gestalt we had better dwell a little bit longer on it.

Actually the field psychologists or the Gestaltists do not deny at all the value of analysis. They are not against it also. It has been said frequently, however, that they are against it, but Lewin says that "nothing could be more erroneous"(2) than this claim. As a matter of fact, Gestalt Psychology differenciates between two kinds of analysis: the destructive one and the non-destructive, if we can call them so. They believe in the second kind which does not "destroy that which it examines and does not overlook the more significant total or 'emergent' properties of it."(3) Lewin gives the following example as an illustration of the two kinds of analysis we have just mentioned. The word "cat", says he, may be seen and analysed as c + a + t which is a meaningful

---

(1) Edwin G. Boring, op. cit. p. 576.

(2) The Fourty-First Yearbook, Part II: "The Psychology of Learning", 1942, p. 217.

(3) Ibid, p. 172.

analysis; this kind of analysis has not destroyed nor overlooked the significance of the "whole". This same word "cat", may also be analysed according to the other kind of analysis, namely, the destructive. It might be analysed as follows : c + a + t + c + a + t ...where all the necessary parts or pieces are found but in "useless form." The two kinds of analysis are, therefore, quite different. Gestalt Psychology protested against the destructive kind and adhered to the positive, functional, or non-destructive kind. "To recognize" says Lewin, "that cat shares a common rhyme or sound properly with bat or mat is representative of the functional analysis preferred by the adherents of the field or 'holistic' approach."(1) In other words "post-analytical data are something quite other than pre-analytical data."(2) All this is to say that we cannot have an adequate perception of a whole by picking out one or another isolated elements within the whole. These elements are meaningless or cannot be judged without consideration of the total structure. In this connection Lewin says that "field theory finds it advantageous, as a rule, to start with a characterization of the situation as a whole. After this first approximation, the various aspects and parts of the situation undergo a more and more specific and detailed analysis."(3) This method, Lewin believes, is the "best safeguard

---

(1) Op. cit. p. 172. (2) Ibid

(3) Ibid, pp. 217-218.

against being misled by one or another element of the situation."[1]

So much for the things against which the Gestalt psychology protested. It is, perhaps, useful now to summarize, likewise, the contributions of this school and to see its positive, constructive side.

1. Perhaps, chief among all other contributions is the concept of "wholeness" which is the cardinal principle of the Gestalt theory.
2. Wertheimer's Phi-Phenomenon and the cortical "short-circuit" between two stimulated "regions" of the brain.
3. The fundamental laws of the structure of Gestalten.
4. Unity of both the physical and psychic worlds.
5. The concept of insight presented by Kohler. This concept is of prime importance in the process of problem solving and learning. Having therefore such a bearing in the field of education we are going to discuss, a word of explanation is necessary.

Insight has been defined as the "patterning of the perceptual field in such a way that the significant relations are apparent; it is the formation of a Gestalt in which the relevant factors fall into place with respect to the whole."[2] The chimpanzee has this insight into his problem (e.g., reaching the banana suspended out of reach) when he perceives a box

---

(1) Op. cit. p. 218.

(2) Edna Heidbreder, "Seven Psychologies", 1933, p. 355.

as something that he can climb upon and which he can place under the fruit to get it. Thus the chimpanzee organized his field in such a way that the banana, the box and his jumping over fell into place to form an organized whole. Seeing this functional relationships among the different factors in the field of perception occurs usually suddenly and as a flash of light as a result of deep and productive thinking or "a state of tension" as Wheeler & Perkins say. They define insight as an internally apprehended correlate of the closing of an incomplete configuration whose very incompleteness has produced the problem initially by keeping the learner in a state of tension.(1) Here we can say also the relation or rather the application of the "law of closure" in the process of learning or problem solving, which is primarily organization and finding relationships. When no relationships are perceived no insight occurs. "A total field" says Kohler, "would be experienced without insight if all its several states, wholes, attitudes, etc., were simply given as a pattern in which none was felt directly to depend upon any other and none to determine any other."(2) Insight therefore is synonimous of the comprehension of relations; "it is a field property of the response when viewed from the point of view of the subject."(3)

---

(1) Wheeler, R.H. and Perkins, F.T. "Principles of Mental Development", The Thomas Y. Crowell Company, New York, 1932, pp. 83-85.

(2) W. Kohler, "Gestalt Psychology", 1929, pp. 371-372.

(3) R.H. Wheeler, "The Science of Psychology", 1940, p. 185.

Insight, says Hartmann, does not refer exclusively to high level and intricate conduct. In its simplest form, insight means "the appropriate behavior in the presence of any life situation."(1) When the baby starts to use the spoon to eat with appropriately shows an illustration of insightful behavior. He sees the relation of the spoon, the distance of the dish and other objects to his own body and particularly to his mouth. When the child lifts his legs to mount a stairway, he shows also an insight into the situation and its demands. Thus insight, says Hartmann, is a "kind of sight, i.e., a mode of perception. It is like all psychological processes, a special kind of neural or cortical organization that is established as soon as the organism achieves its purposes."(2) These purposes are achieved, of course, when the "closing" of an incomplete configuration is achieved. Until this is done the learner remains in a state of tension.

There are, however degrees of insight. At its highest level it seems to take the form of "foresight". There is also some organization on the "pre-insight" level. The usual and more common type of insight emerges as the "hindsight" following usually a period of manual or mental exploration.

---

(1) The Fourty-First Yearbook, Part II, "The Psychology of Learning", 1942, p. 191.

(2) Ibid, pp. 191-192.

Another characteristic of insight is that it may prove to be deceptive. Whenever a person gets insight into a problem he usually believes that his apprehension of the problem is correct. Thus false insights might occur: "They are plausible mental organizations that seem to fit the situation but actually fail to do so, even though they may approximate the true solution."(1) This may be due to the incomplete structure of the field or to the observer's unability to see some "field forces" which may give rise to illusions. Thus one should try to gain perspective of the field and to resort to testing in every phase of the organizational process.

Heredity and Environment

6. The Sixth Contribution of the Gestalt school is the emphasis it put upon the environment whenever the problem of environment and heredity, and the ego and its surrounding are to be discussed. This does not mean that they do not take heredity into full account. The school, gives equal credit to both with some environmental bias sometimes. "There is no life", say Brown and Menninger,"without the hereditary basis for life, but equally no life without what Henderson has called an environment of certain fitness."(2) In fact, the trend in

---

(1) Hartmann, in the Fourty-First Yearbook, Part II, 1942, p.197.

(2) J.F. Brown, with Col. of K. Menninger, "Psychodynamics of Abnormal Behavior", 1940, p. 17.

Gestalt Psychology is to consider both heredity and environment as a unified whole. In this connection Louis Price says: "The Gestaltians unify heredity and environment under one concept, the 'growth potential' of the individual, which extended implies that the individual and society are phases of one whole."(1) This"growth potential" is the result of the dynamical interaction between heredity and environment. The fertilized egg for instance has a "minimum of structure" as Hartmann puts it, but its growth and differentiation are due to its interaction with a "nutrient environment". We know that this egg splits time after time to produce ultimately the different members of the body. These members grow in fixed directions and the initial egg goes on changing and developing so that no resemblance to its microscopic origin is kept constant. All this is not due to one factor only but it is due to the two unseparable factors heredity and environment or rather "heredity in environment" as Brown puts it. "We can no longer say 'heredity versus environment', but must rather say 'heredity in environment'. We can no longer say 'the individual versus his sociopsychological surroundings', but rather 'the individual in and as a part of his sociopsychological surroundings.'"(2) All this to say that we cannot draw a sure line between the heredity and the environment in any one of their aspects or stages.

---

(1) Louise Price, "Creative Group Work on the Campus", Teachers College, Columbia University, New York, 1941, p. 28.

(2) J.F. Brown, with col. of K. Menninger, op. cit. p. 14.

The modern axiom of biology "no heredity without environment and no environment without heredity" has become widespread to-day. What is very significant in Gestalt view to the environment is this: my environment which I respond to is different from yours although we might be in an identical physical environment. Each one reacts to his environment as he perceives it, as it appears to him, although this appearance may not correspond perfectly to the reality. "The environment in which we behave", says Koffka, "is not only the actually and palpably present behavioral environment, but also the environment which we 'merely' imagine or think of."(1) Koffka adds also that "this environment is responsible for the greatest achievements of mankind. Without it neither the sciences nor the arts would be possible."(2) When speaking about "Behavior and its Field", Koffka makes a very clever comparison between the physical or the "geographical" environment, as he calls it, and the "behavioral environment" to which we respond. He made this comparison by using the following German legend of the "Lake of Constance":

"On a winter evening amidst a driving snowstorm a man on horseback arrived at an inn, happy to have reached a shelter after hours of riding over the wind-swept plain on which the blanket of snow had covered all paths and landmarks.

---

(1) K. Koffka, "Principles of Gestalt Psychology", 1935, p. 422.
(2) Ibid.

The landlord who came to the door viewed the stranger with surprise and asked him whence he came. The man pointed in the direction straight away from the inn, whereupon the landlord, in a tone of awe and wonder, said: 'Do you know that you have ridden across the Lake of Constance?' At which the rider dropped stone dead at his feet.

In what environment, then, did the behaviour of the stranger take place? The Lake of Constance. Certainly, because it is a true proposition that he rode across it. And yet, this is not the whole truth, for the fact that there was a frozen lake and not ordinary solid ground did not affect his behaviour in the slightest. It is interesting for the geographer that this behaviour took place in this particular locality, but not for the psychologist as the student of behaviour; because the behaviour would have been just the same had the man ridden across a barren plain. But the psychologist knows something more: since the man died from sheer fright after having learned what he had 'really' done, the psychologist must conclude that had the stranger known before, his rinding behaviour would have been very different from what it actually was. Therefore the psychologist will have to say: There is a second sense to the word environment according to which our horseman did not ride across the lake at all, but across an ordinary snow-swept plain. His behaviour was a riding-over-a-plain, but not a riding-over-a-lake."(1)

---

(1) K. Koffka, op. cit. pp. 27-28.

Thus their distinction between the geographical and behavioural environments is clear. In the previous example, to the horseman the lake was the geographical environment and the plain was his behavioural environment. This differentiation between the two kinds of environment is important in psychology which is concerned with the individual behaving in a certain environment. The task of our psychology, says Koffka, is "The study of behaviour in its causal connection with the psychological field."(1) Unless these two poles, namely, the individual and his psychological field, are known, the behaviour cannot be studied. How does Gestalt psychology conceive of these two poles? Again Koffka answers this question by saying that "the psychological field is organized. First of all, it shows the polarity of the ego and the environment, and secondly, each of these two polar parts has its own structure. Thus the environment is neither a mosaic of sensations nor a 'blooming, buzzing confusion', nor a blurred and vague total unit; rather does it consist of a definite number of separate objects and events, which, as separate objects and events, are products of organization. Likewise, the ego is neither a point nor a sum or mosaic of drives or instincts."(2)

The emphasis of the school on the environmental factor is felt in their conception of the function of the environment

---

(1) K. Koffka, op. cit. p. 67.

(2) Ibid, p. 67.

in the process of growth. "The function of environment", says Wheeler, "is to raise the growth potential, not merely to permit its expression. Inheritence", adds he, "does not supply enough energy for growth or for intelligence. It provides the beginning, and when other things are equal, the direction, of growth."(1) It is known that the genes are the carriers of the hereditary traits; but, are these genes independent determinants of these traits? "The contribution that one of (the genes) makes to the organism", says Wheeler, "depends upon the contribution that all the other genes are making."(2) Not only this, but Wheeler goes farther on to say that whether any gene will make any contribution to the organism or not "depends upon the field properties of the organic mass into which the cells are growing."(3) This is in line with his "Law of Determined Activity." This has been proved experimentally, when some biologists took out of a young embryo tissues or cells which were intended to form the eyes and transplanted them in a region which is not proper for eye formation, and no eyes developed there. H.J. Muller and his colleagues(4) has shown also that new species of the Drosophila (a fruit fly) were able to be created by radiation of the eggs.

---

(1) R.H. Wheeler, "The Science of Psychology", 1940, p. 169.

(2) Ibid, p. 167.

(3) Ibid, op. cit. p. 167.

(4) See Brown and Menninger, 1940, op. cit. p. 15.

Although similar human manipulations are not easy nowadays, yet the future is liable to witness such crucial enterprises. Lysenko, the Russian botanist and agriculturalist goes a step further in emphasizing the effect of environment to the extent that he rejects "the whole edifice of Mendelian genetics, denying even the well-attested 3 : 1 ratio of Mendel."(1) He believes that heredity must be "susceptible of environmental alteration, that acquired characters of organisms should be transmitted, so that man may the more easily direct the development of an organism to his own use."(2) If Lysenko-Michurin view is right a kind of revolution in the field of science will take place and this will lead, for sure, to very meaningful results.

Intelligence

8. Very much related to the previous contribution is that of intelligence. The Gestalt conception of intelligence is perhaps the most progressive and integrative one. The Gestalt psychologists believe in the unity of intelligence and that there is no difference between the structure and the content of intelligence. They are nearer to Spearman's concept than to Thorndike's. Intelligence is a general ability, and

---

(1) and (2) J.A.H. Waterhouse in "The Yearbook of Education, 1950", p. 105.

an indivisible whole. In 1927, Spearman wrote: "The observed facts indicate that all branches of intellectual activity have in common one fundamental function (or group of functions) whereas the remaining of specific elements seem in every case to be different from that in all the others."(1) This theory implies that every individual's achievement, or every intellectual ability may be resolved into a general factor (G) common to all the abilities measured and a specific factor (s) peculiar to each particular ability. This may be represented mathematically as follows: "Score = $a_1G + a_2s, \ldots\ldots(+a_{n+1}s_n)$"(2) where "Score" is the score of an individual on a given mental test, "a_1" and "a_2" are the "weights" or "loads" of the two factors G and S respectively.

Some configurationists have seen that this theory of "G" and "S's" is amenable to the whole-part brand of interpretation. Wheeler, for instance, who is one of those configurationists says:

"Every form of behaviour is a pattern response, the most obvious features of which are its specialized aspects, but the total pattern is always functioning. Hold out your hand and bend your wrist. The wrist motion is merely a local specialization or individuation of the whole act of holding out the arm. Whatever the wrist is doing at any time is part

---

(1) H.R. Hamley in "The Year Book of Education, 1935", published by Evans Brothers Ltd., Russell Square, London, p. 415.

(2) Ibid, p. 416.

of something the arm is doing. In like manner, when a person is solving an arithmetic problem he is exhibiting a specialized intellectual performance comparable to the wrist movement. There is a total intellectual pattern from which the arithmetical reasoning individuates. This pattern is the insightful aspect of the individual's total mental life and corresponds to what the arm is doing in the wrist illustration. This means that Spearman's S's are not factors separate from G. G and S are abstractions, and in reality, arti-facts. When the wrist is bent we have an arm-act as much as wrist-act. If the arm were moved without bending the wrist, the wrist would move also. The only difference between the two is differentiation of the arm movement itself in the one case and not in the other. In this sense, so-called 'special' abilities are merely differentiations of so-called 'general' ability ..... There is apparently no reason for believing that a person could not undergo the maturation processes necessary for equivalent scores in every test he took. It is well known that the brilliant individual is especially good in everything he does, all things considered. Lack of opportunity, interest, and proper stimulation should account for all exceptions."(1) This is really a very progressive conception of intelligence which qualifies education with a great possibility of helping in the formation of well rounded and ever growing personalities.

---

(1) R.H. Wheeler, "Principles of Mental Development", Thomas Y. Crowell Company, 1932, New York, pp. 193-194.

Gestalt psychologists do not admit a person to be bright and dull at the same time. This dichotomy if it exists must be attributed to environmental factors, "lack of opportunity, interest and proper stimulation". This is especially true in an earlier age. This is also in accordance with the results of recent research in psychology which hold that "correlation rather than compensation is the rule."(1) This means that the natural rule of growth is correlation among abilities, every other conditions being equal, and not the growth of one ability on the expense of the other. Environmental factors are much more manipulable than hereditary factors; if the manipulation is proper the intelligence might be helped to grow in any stage of its development. Lewin says that: "Recently experiments have shown that the intelligence of a child is greatly changed by different types of surroundings. There is plenty of evidence that stability or instability of the surroundings makes for stability or instability of the growing child. It is well known how the mood or tension of the mother will affect the child's mood or tension."(2) If this is true, the concept of the constancy of I.Q. is challenged and shaken. In fact this is exactly what happened. L.B. Murphy(3) in 1937 showed

---

(1) Louis P. Thorpe, "Child Psychology and Development", the Ronald Press Company, New York, 1946, p. 272.

(2) K. Lewin, "Resolving Social Conflicts", Harper and Brothers Publishers, New York, 1945, p. 174.

(3) L.B. Murphy, "Social Behaviour and Child Personality", Columbia University Press, New York, 1937.

that orphan children living under poor opportunities and great social restrictions grew negatively in their mental capacity, so to speak, that their mental age increased too slowly to cope with their chronological age. In other words their I.Q. decreased. The same psychologist showed also an increase of I.Q. of children living under better conditions.

More recently Anastasi and Foley when referring to the studies done in Iowa in 1942, they wrote: "... Children who remained with their feebleminded mothers tended to lose in I.Q. with age, while those who were placed with more intelligent foster parents seemed to develop normally."(1) The same two authors report an interesting demonstration of the fact that the attention from adults, to the growing child, plays an important part in his intellectual and emotional development. They report that R.A. Spitz(2) made an inquiry in the development of infants in two European institutions. The experimenter describes the first institution as "Foundling Home", i.e., an ordinary orphanage in which hygienic and medical care was excellently taken by a trained nursing staff each nurse having charge of eight babies. The other institution, designated as "Nursery", was established to care for the new-born babies of delinquent girls in a penal institution. Even though the two institutions were similar in physical and medical cares and

---

(1) Anne Anastasi & John P. Foley, Jr. "Differential Psychology", The Macmillan Company, New York, 1949, p. 364.

(2) For details see: R.A. Spitz, "Hospitalism. An inquiry into the Genesis of Psychiatric Conditions in Early Childhood," Psycho-anal. stud. child., 1945, 1, 53-74, 113-117. Also see of the same author Spitz, "Anaclitic Depression," Psycho-anal. stud. child, 1946, 2, 313-342.

facilities, a great difference existed between them. The infants in "Foundling Home" were kept isolated in cots with no toys or objects other than bedding and clothing. They actually had no opportunity for locomotion. As to the "Nursery" infants, they were less isolated, they had their toys, and were cared for by their mothers under the supervision of the nursing staff. The two groups were periodically examined with the Hetzer and Wolf Baby Tests. We have to mention here that according to the investigator, children in "Foundling Home" were superior to those in "Nursery", in terms of parental background. However, the initial developmental quotient based upon performance during the first four months of life agreed with the investigator's evidence of the superiority, in terms of parental background, of the "Foundling Home" children. The 61 children observed in "Foundling Home" averaged 124 in I.Q., while the 69 children of "Nursery" averaged 101.5 only. But by the end of the first year the average 124 I.Q. had dropped to 72 while that of the "Nursery" children had risen to 105, and remained subsequently close to normal. As to the average I.Q. of the "Foundling Home", it continued to drop, reaching by the end of the second year the level of 45. Furthermore, a considerable proportion of the infant in "Foundling Home" developed what appeared to be a clear-cut clinical syndrome, including extreme depression, retardation in all behaviour development, and complete withdrawal and immobility,

in some cases.[1]

Thus the effect of the environment is made quite obvious. It is made obvious also in the cure of such a serious condition. Anastasi and Foley report that, in its early stages, this condition could be improved by returning the mothers to the children or by placing them where they were free to move about and to have contact with other children and adults. But, add the authors, if the depressed condition was allowed to continue unchecked for about three months or more, the child failed to respond to such changes in treatment and the damage seemed to be permanent.[2]

Thus, due to the new attitude in research, to such conceptions of growth and intelligence, and to the unbiased findings and results, psychologists, says Brown, have gradually changed from viewing intelligence as a "class-determined" concept to viewing it as a "field-determined" one. In the light of this the unconstancy of I.Q. is easily understandable. Brown's account for this is sufficiently interesting and provocative to quote in full:

"Until very recently psychologists and biologists always believed that this factor (e.g., intelligence) was almost completely determined in the germ plasm. The I.Q. as a measurement of these correlated traits - which psychologists

---

(1) Anastasi and Foley, op. cit. pp. 365-366.

(2) Ibid, p. 366.

call intelligence - was considered constant so that one accurate measurement would fix it. Recent researches have indicated quite clearly that very moderate changes in the psychological surrounding field will change the I.Q. by 15 to 20 per cent, and cases of fairly radical changes - through psychoanalytical treatment, for instance - up to 40 per cent. That is to say, subnormals with I.Qs around 85 have been brought up to normal, and even some morons, I.Q. = 60, have been made normal through specialised education. Doubtless many normals have been raised equally by a favorable 'environment' and certainly many a potential genius has retrogressed through unfavorable surrounding field conditions. The cases reported are usually of subnormal children from households rich enough to allow the employment of the services of specialists."(1)

Being a social psychologist, Brown when dealing with the relative intelligence of different races and different social strata he attributes the existing difference mainly to economic factor and not to hereditary matter beyond human control. Early researches on this field, says he, "were all misinterpreted." He adds that "we invariably find the economic or racial underdog averaging lower in intelligence than the racial and economic master. When intelligence was considered purely an hereditary matter, one concluded that these

---

(1) J.F. Brown, with the col. of K. Menninger, "The Psychodynamics of Abnormal Behaviour", McGraw-Hill Book Company, Inc., New York and London, 1940, pp. 17-18.

were differences beyond human control. Modern research has changed this viewpoint, so that the old slogan of the 'poor are poor because they are dumb' must be changed to the 'Poor and dumb because they are poor'."(1) It has become a recognized fact, nowadays that the socio-economic factors influence not only intelligence but also emotional adjustment and other personality characteristics.(2) In the field of racial comparisons, thanks to Gestalt theory mainly, the difference in I.Q. between races is more scientifically explained. The new trend is to account for the existing difference in terms of environmental rather than hereditary factors. Klineberg, for instance, mentions the following environmental considerations as important in this connection.

"The relationship of the subjects to the tester, on the degree of rapport between them, may obviously differ in the case of two racial groups. Their motivation, or their anxiety to do well on the test, cannot always be presumed to be similar.... Even within one race, socio-economic and educational factors are of importance; their weight is all the greater in any comparison, for example, of Negroes and Whites, who differ so greatly in economic opportunities and in the nature of schooling and other education available."(3)

---

(1) J.F. Brown, op. cit. 1940, p. 18.

(2) Anastasi and Foley, 1949, op. cit., p. 733.

(3) Otto Klineberg, "Social Psychology", Henry Holt and Company, New York, 1945, p. 298.

To all these Klineberg adds the general difference in culture among races and the actual misunderstanding of the purpose of the test. However, this present difference among races does not mean that every individual in the superior race is more intelligent than every individual in the other race. This difference is only in terms of the average. It is interesting to mention here at least one of the cases of gifted Negro children recently described by Witty and Jerkins.(1) It is the case of that young girl of nine who was of almost unmixed African ancestry. She had a Bivet I.Q. of 200 which is a very high score. Very few indeed of the thousands of white children tested got the same I.Q. To this fact Klineberg says: "It goes without saying that any restrictions placed upon this girl on grounds of race have no foundation in the science of psychology."(2)

This is how the Gestalt psychology directed the investigation in the field, theoretical approach and this is how this school views intelligence. Gestaltists define the intelligent behaviour as the "behaviour which arrives at goals."(3) According to their concept of intelligence they built their intelligence tests to measure it and according to

---

(1) P.A. Witty, Jerkind, M.D. "The case of 'B_1' a Gifted Negro Girl," J. Soc. Psychol., 1935, 6 : pp. 117-124.

(2) Otto Klineberg, op. cit., p. 301.

(3) J.F. Brown, 1940, p. 17.

the Gestalt theory what is called the "Rorschach Test" was built and meant to be a personality test and an intelligence test also. However, the law of "closure" has been applied in tests formation very widely. In good many tests we see one completion subtest at least; there are also many tests which are mainly completion tests.

Street has recently standardized a Gestalt completion test which was published in 1931 in Teachers College, Columbia University. This test was made of fifteen items or picture puzzles. The ability of the subject will manifest itself by supplying the missing parts and by perceiving in his own mind the whole figure. This according to Street depends upon the maturity and the social experience of the testee. Hartmann in his book "Gestalt Psychology" put the following figure (1) to represent one of the Street's more difficult "tests". Only three-tenths of one percent of grammar-school children succeeded in seeing

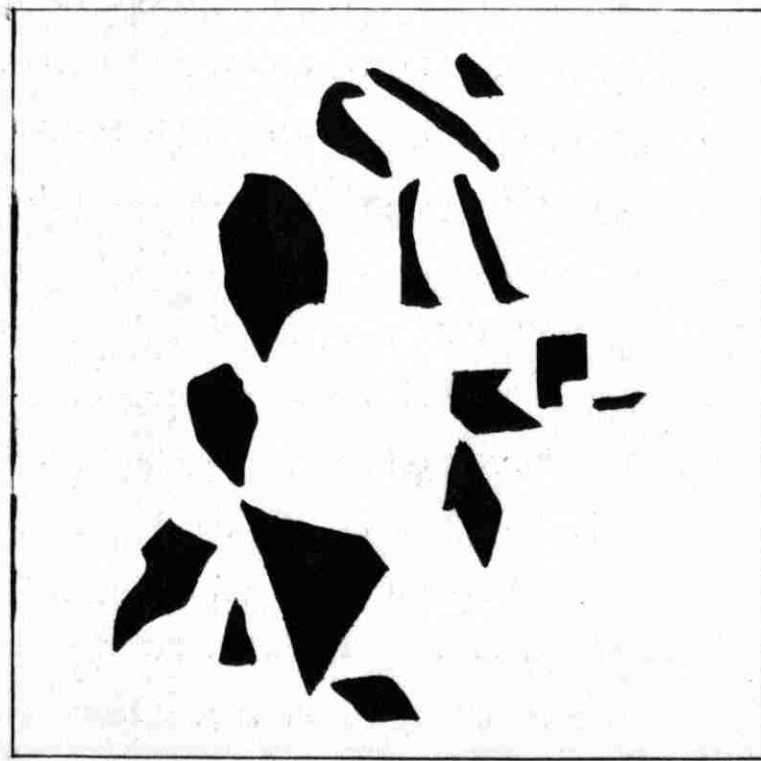


Fig. I

(1) George W. Hartmann, "Gestalt Psychology", 1935, p. 266.

the pattern. Do you know what does this figure represent? You have to complete it in such a way as to see a man taking a picture with a camera.

We have said that the Gestalt concept of intelligence is nearer to that of Spearman's, e.g., intelligence is a general and unified ability. Such a concept has helped to show the weakness of the group-factor type of test which ignores the fact that "intelligence expresses itself in behaviour as a combination, a unity of function, not as a series of independent factors."(1) On the other hand the modern concept of intelligence is more comprehensive and global than it was before the rise of the Gestalt school. Wechsler's definition of intelligence is: "The aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment."(2) Thus intelligence is no more confined to the mental side but it rather involves the whole behaviour and emotional adjustment as well. In other words, intelligence tests nowadays tend to involve the whole personality with both intellectual and non-intellectual traits.

---

(1) Frank S. Freeman, "Theory and Practice of Psychological Testing," Henry Holt and Company, New York, 1950, p. 88 footnote.

(2) D. Wechsler, "The Measurement of Adult Intelligence", the Williams and Wilkins Co., Baltimore, 1944, p. 3.

Problem Solving and Insight

It is time now to see the intelligence in action, e.g., in thinking and problem solving. Gestalt psychologists believe that thinking and problem solving are progressive realization of forms, continuous action, or in other words they are a process of recentering. By recentering is meant that "the discovery of new forms of figure-ground organization in which an inadequate and ultimately disorderly mode of centering or focussing is thrust aside in favor of a newly recentered pattern."(1) This new organization or "the newly recentered pattern" is now "insightful and correct in the sense of mediating contact with reality, because the center as apprehended by the observer corresponds with a natural center in the objective event waiting for such discovery."(2) Thus through this process of recentering or forming better organizations we are able to discover new things and solve new problems. The organization or the recentering process cannot reach the solution usually unless it is insightful and correct in the sense that it corresponds with the natural order and organization. According to the Gestalt psychologists solving a problem in not at all like Thorndike's stamping in and stamping out of definite pre-existing bonds, "but an activity

---

(1) Gardner Murphy, "Historical Introduction to Modern Psychology", Revised edition, 1949, p. 290.

(2) Ibid.

directed toward an end, an activity that is a continuous whole, and in which every part-activity falls into place in the total pattern that alone gives it significance."(1) In other words problem solving takes place through a process of insight. What is this insight? Hartley, Birch, and Hartley say that "Insight is frequently thought to be a sudden occurrence, in which experience is a revelatory Ah-Ha type. However, insights do not develop out of nothing. On the contrary, they are based on the background of past experience possessed by an organism and on its ability to restructure this repertoire of past experience."(2) Suppose we have the following problem to solve: "With only six matches construct four equilateral triangles, without breaking any of the matches." How do you proceed to solve this problem? Watch also your friends to see how do they solve it? Perhaps every one will put the matches on a table, for instance, and try to produce the appropriate arrangement. Perhaps some of you will pass by the stage in which he needs seven matches and not just six to solve the problem like in this figure (II). This makes him feel that he is on the road to the solution while later on he will see that he is not. Thus he will not

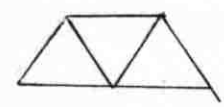


Fig. II

---

(1) Edna Heidbreder, "Seven Psychologies", 1933, p. 354.

(2) "Outside Reading in Psychology", edited by: Eugene L. Hartley, Herbert G. Birch, and Ruth E. Hartley, Thomas Y. Crowell Company, New York, 1950, p. 582.

reach the solution until his "imagination" is liberated by the suggestion that the triangles do not need to lie in the same plane. Then he will realize that the solution will lie in a solid figure, the tetrahedron (figure III).

Fig. III

Insight Versus Trials and Errors

Now, did the solution come through "trials and errors"? Or did it come through "insight"? No doubt, there have been "trials and errors" during the process; Gestalt psychology does not deny their usual existence in problem solving or learning. But the question is "are trials and errors able to explain the heart of problem solving or learning? "Probably" says Hartmann, "no more than bank checks and copper pennies describe the essentials of a nations economic life - a check-and-penny interpretation of economics certainly seems superficial, although no one denies the existence of these media of exchange."(1) Trial and error cannot be an explanation of how we learn or solve a problem. "One could 'try and err' until doomsday, but if the necessary insight into a situation is not forthcoming, the problem remains unsolved."(2) Nevertheless,

---

(1) Hartmann in the Fourty-First Year Book, Part II, 1942, p. 193.

(2) Hartmann, op. cit. p. 193.

Gestalt psychologists do not conceive trial and error to be blind as Thorndike used to believe; they always involve some loosely formed "hypotheses". This, however, does not deny the fact that Thorndike was right when he reported some more or less blind trial and error in some animal behaviours. Many animals have been reported to be extremely dull in the laboratory; their reactions were of the "trial and error" kind primarily. But this does not mean that this is the way they solve their problems. The problems, the experimenter confront the animal with may not be real problems to the animal as they are to the experimenter. On the other hand the animal, when in laboratory, may not feel at home or may not be interested or motivated toward an accepted goal, and his behaviour might show abnormalities and lack of insight.(1)

This is closely related to Thorndike and the associationists' account for the solution of a novel problem. They maintain that "the learner assembles his experiences from the past appropriate to the new problem, responding either according to elements common to old and the new situations, or according to aspects of the new situation which are similar to old situations."(2) In other words, we do solve our problems,

---

(1) For a more elaborated discussion of this point, see the interesting comment done by Kohler in "Psychologies of 1930", edited by Carl Murchison, Clark University Press, 1930, pp. 156-157.

(2) Ernest R. Hilgard, "Theories of Learning", Appleton-Century-Crofts, Inc., New York, 1948, p. 16.

thanks to our past experiences and previous learning. Gestalt psychology disagrees with this explanation. This school holds that even with appropriate past experience we may not solve the problem if it is presented one way and may solve it if presented differently. What determines our possibility to solve a novel problem, therefore, is the contemporary structuring of the field and not only the previous experience. The school, we mentioned more than once, does not deny the effects of past experience in solving problem, but it believes that the important and decisive factor is the contemporary structure of the field. Kohler gives this figure (IV)[1] as an example. The reader, he says, will see two unknown forms through which a horizontal line is laid. When I tell the reader, says Kohler, that the number 4 is before him in the field, he will then find it; otherwise he will confess that the form of the 4 did not exist in the visual field at first and if it began to exist later on, that meant a "transformation of visual reality." Hence, Kohler concludes that "the reality of a form depends upon the existence of a definite whole which when segregated as such, has that

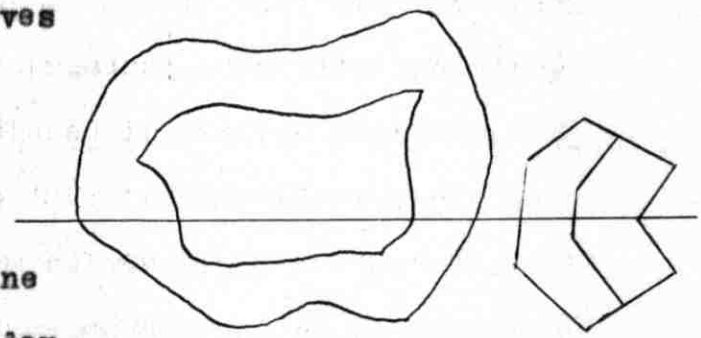


Fig. IV

---

(1) W. Kohler, "Gestalt Psychology", 1929, p. 200.

(2) Kohler, op. cit. p. 200.

real form, others which would correspond to other wholes, being excluded from visual existence."[1] Thus in the previous figure (IV) which makes the number 4 difficult to recognize is that the reader could perceive a definite organization, consisting of two unknown wholes and of a horizontal line traversing them. Thus one part of the figure 4 is absorbed by the big whole, the second part by the smaller whole, and the rest by the horizontal line. To see the number 4 easily as a real form, it should have had a pre-existing segregated whole. The objects around us are, most often, very stable wholes; therefore, we regularly see them with their definite forms. Hence, "form is a property exclusively of segregated wholes."[2] All this is to say that previous experience is not enough to explain perceptions. The number 4, for instance, is a well known form; yet the reader could not see it. But here one can say that we have never seen the 4 in such an environment before. This objection is of little value because "no explanation in terms of previous experience is needed when 4 is given upon a homogeneous ground, as it usually is."[3] On the other hand, why the unusual environment does not prevent the reader from seeing the same 4 in the following

---

(1) Kohler, op. cit. p. 200.

(2) Ibid, p. 203.

(3) Ibid, p. 210, Figure 14.

figure (V)?[1] The 4 here is seen at once, although the environment is not less unusual than in the first case. The 4 is easily seen here because the relation between the geometrical parts of the

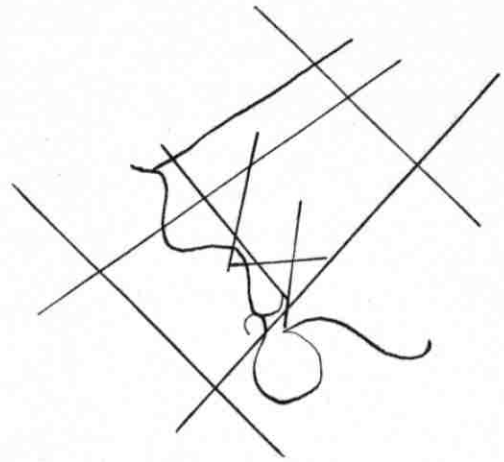


Fig. V

4 and the added lines is not such that the parts of the 4 are absorbed in the formation of other segregated wholes. Therefore, Kohler concludes that "any influence of past experience upon the organization of forms in the future depends upon the degree and the stability of original organization in the actual case."[2] It is clear now, from the foregoing discussion that the Gestaltists do not deny the effect of past experience in the actual case, but they do limit this effect to "the degree and the stability of original organization in the actual case", as Kohler has just said. If this degree is small (e.g., if the absorption is strong) the effect will be smaller and vice versa. Look at this figure (VI)[3] and try to describe it; the letter E will not be seen easily inspite its presence and your familiarity with it. The same may be

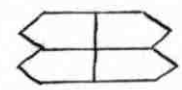


Fig. VI

---

(1) Kohler, op. cit. p. 210, Figure 14.

(2) Ibid, p. 210.

(3) Ibid, p. 210.

said to the following figures (VII, VIII)[1]. The first one may be beheld as an ornament for a longtime before one can find two H's in it. In the second one also the letter K is absorbed by the whole figure so its detection is not so easy.

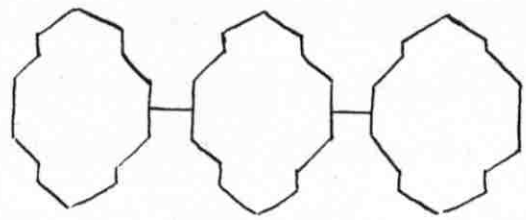


Fig. VII

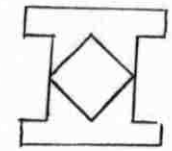


Fig. VIII

Thus Gestalt psychology disagrees with associationism which maintains that we solve novel problems thanks to our previous experiences; Gestaltists rather believe that the effect of past experiences[2] is limited and the decisive factor in problem solving is the contemporary structure of the field.

In a similar way the Gestaltists do not believe in "trial and error" as an explanation of the heart of the problem solving or of learning. "The learner", says Hartmann, "never goes randomly through his entire repertoire of behaviour, like a man testing a large bundle of keys on a lock in the dark, but always limits his early endeavours in the light of restricted

---

(1) Kohler, op. cit. p. 211.

(2) "It will not be necessary to point out that an anti-empiristic attitude does not mean the denial of the enormous value of experience. Not that it makes use of experience causes our objection to empiricism, but how it makes use of it." K. Koffka, "Principles of Gestalt Psychology", 1935, p. 639, footnote.

and not unreasonable probabilities." This is not the case of human learners only; it includes also other animals "within the limits of their comprehension and bodily machinery, all other animals react in much the same fashion."

Experiments on Apes

This idea was proven by Kohler in his experiments on apes. Through these experiments also he could show the inadequacy of Thorndike's laws of learning and particularly the "law of effect". Perhaps what made Kohler doubt the validity of Thorndike's laws is that the background of Thorndike was associationism. Another thing that Kohler did not like in Thorndike's experiments was that he used only mazes and puzzle-boxes with his dogs, cats, apes, etc..... When these animals were put into these mazes or boxes it was impossible for them to perceive the whole situation and gain a general perspective. This fact urged Kohler to arrange new types of experiments in which the ape were put face to face with the whole problem. The Chimpanzee, for instance, was put into a cage, some banana were suspended from the ceiling of the cage out of reach by the chimpanzee's bare hands. In the end of the cage Kohler put a stick also which the ape saw when moving in the cage. He picked up the stick and manipulated it but did not see in it any means to help him get the fruit. Then

after using this stick to pull many other things, the ape was able to use it in solving the fruit problem. Why does the ape fail at the beginning to get the fruit? Probably because the banana and the stick did not fall in the same visual field.

In a more interesting experiment Kohler showed "how the fundamental motors of behaviour can bring about more complicated conduct through direct determination."(1) "...Outside the animal cage a banana is placed on the ground, beyond the reach of his arm. In a similar situation some days before the ape had used a stick as an instrument for the first time. He finds a stick today, but it is a rough thing. A branch projects from the side of the stick, near the ape's hand. At first this branch does not operate as an obstacle because when he reaches for the fruit, the ape holds his instrument accidentally in such a position that the branch is parallel to the bars of the cage and does not touch them. Presently however, in order to change his place with regard to the fruit, the ape pulls the stick back into the cage. When he reaches for the fruit again, the branch hits a bar and the stick does not move in the direction of the fruit. The animal tries to overcome the difficulty by pushing hard and crudely a few times. Suddently, however, and just after pressing forward with all his force, he pulls the stick back in the cage and

---

(1) W. Kohler, "Gestalt Psychology", 1929, p. 592.

bites the branch with the ferocity of anger...." (1) Thus the ape kept his aim (to get the fruit) always in front of him. He could see always the relationship between the means and the end, and this is what is called insight.

Perhaps the most clever performance the brightest of Kohler's apes did is this: He succeeded to learn how to join together two sticks of bamboo in order to make out of them a longer stick. He could not reach for his goal by any of them separately, because each one was too short to be useful alone. The ape, however, reached for his goal after one hour of work and trial and error. He attained the goal suddenly and with a great activity after fatigue and relaxation. The ape was able to recall this on the next day, a fact which proves his insight. Thus Kohler was strongly convinced that apes like the human beings reach the solution of their problems at once through integration and insight. They do not resort to the dismembered parts, but they rather begin by comprehending more clearly the whole situation . We should mention here that in the light of these experiments many concepts of associations were reinterpreted. "Indeed; says Kohler, "even Thorndike, whose attitude regarding association is more conservative, seems to transform the concept in such a manner that a certain 'belonging together' is an absolute prerequisite, if an association is to be formed

---

(1) W. Kohler, op. cit. pp. 392-393.

between two parts of our experience."(1)

So much for the contributions afforded by the Gestalt school of psychology. This does not indicate at all that their contributions are limited to what we have just mentioned. They contributed to normal and abnormal psychology, to business possibilities, to the social works, to Athletics, Aesthetics, ethics, and to the whole field of education. Perhaps the most important contribution is that new orientation the Gestalt school gave to human thought.

---

(1) "Psychologies of 1930", edited by Carl Murchison, Clark University Press, 1930, p. 153.

CHAPTER VI

Educational Implications

Our main concern in this chapter will be the educational implications of this school of thought. Consequently, we shall concentrate more upon the teaching-learning process. Nevertheless, if Gestalt psychology is to be applied to education adequately and if the resultant systematical education were to be given a name, the most suitable name would be "Progressive education" and no doubt, John Dewey will be the leader or the pioneer exemplified of this creative movement. As a matter of fact, it is a curious coincidence to see Dewey since 1914 in America write his excellent bible of education the famous "Democracy and Education"(1) which is perhaps the most appropriate application of Gestalt psychology which was just begun in Germany. To me this curious coincidence may be considered as an indication of the real value of both systems of psychology and education.

Aim of Education

Dewey conceives education to be, not the cultivation of faculties, nor the preparation for future life, he rather conceives education and life as essentially the same process. "Since growth is the characteristic of life, education is all one with growing; it has no end beyond itself."(2) It is safe

---

(1) John Dewey "Democracy and Education", The Macmillan Company, 23rd printing, 1960, New York, first published in 1916.

(2) Ibid. P. 62.

therefore to conclude that the aim of education is "to enable individuals to continue their education - or that the object and reward of learning is continued capacity for growth."(1) It is quite obvious here that Dewey does not believe in the separation of elementary, secondary and higher education. He does not admit dichotomies, since education to him is one process of growing throughout the whole lives of the individual and of society.

Education and society

To realize this concept of education, Dewey asks for a democratic society in the full sense of the word. "This idea" (of growth), says Dewey, "cannot be applied to all the members of a society except when intercourse of man with man is mutual, and where there is adequate provision for the reconstruction of social habits and institutions by means of wide stimulation arising from equitably distributed interests (e.g. no exploitation of any person by any other person or group). And this means a democratic society."(2) The process of growth, the comprehensive growth of an individual is not possible but in a free and democratic society where no classes nor privileges exist. The more freely the individuals interact and the easier their experiences are interchanged the stronger and more meaningful their growth will be. What is said to society may be said also to the school, for Dewey does not admit the school to be separated from society and life. He says that "the criterion of the value of school education is the extent in which it creates a

---

(1) Ibid. P. 117.

(2) J. Dewey, op. cit. P.117.

desire for continued growth and supplies means for making the desire effective in fact."(1) Knowledge alone is of no value unless it is coupled with activities and ended by functional application. Not only this, but Dewey believes, that the real effective knowledge cannot be acquired and cannot help in the process of growth unless it comes through "activities, or occupations, carried on in a medium of associated life",(2) and not in an ivory tower. That is why he makes his motto "learning by doing". Opportunities for manipulation, exploration, investigation, guidance and motivation, allshould be provided by the school. When speaking about "education as a social function" Dewey says that the social environment "is truly educative in its effect in the degree in which an individual shares or participates in some conjoint activity. By doing his share in the associated activity, the individual appropriates the purpose which actuates it, becomes familiar with its methods and subject matters, acquires needed skill, and is saturated with its emotional spirit."(3) Now, since we learn by doing and we grow through activities we share in within our social environment, it has become imperative that the school should provide the effective and stimulating environment full of activities and life, able to arouse, before the young learners, challenging problems and thus to create in their active minds gaps to be "closed" as the

---

(1)Ibid. P. 62.

(2)Dewey, op. cit. P. 401.

(3)Ibid. P. 26.

Gestaltists say. Thus, like the Gestaltists, Dewey puts the emphasis upon the environment. Problematic situations, within the learner's ability and level of growth, are best motivational factors for activities. Through these activities in which the individual participates with the various groups to which he belongs and without conscious intent, "the deeper and more intimate educative formation of disposition comes."(1) School and society being so closely related to any growing complexity in society the school should answer by providing "a special social environment which shall especially look after nurturing the capacities of the immature."(2) This special environment, says Dewey, has many functions; three of the more important functions are: "Simplifying the factors of the disposition it is wished to develop; purifying and idealizing the existing social customs; creating a wider and better balanced environment than that by which the young would be likely, if left to themselves, to be influenced."(3)

Furthermore, like the Gestalt psychologists, Dewey is monistic also; he unifies the physical and the social, the individual and society, the individual and the world, the subject matter and the method, the play and work, the interest and discipline, labor and leisure, the social and the moral and the aim and its means of attaining it. Actually when one reads Dewey one senses that he is not far from Köhler, for instance, nor from the Gestalt school in general. Intelligence, for example, has been conceived the same way by both Dewey and Brown; both define intelligent be-

---

(1) Dewey, op. cit. P. 26

(2) Ibid. P. 27.

(3) Ibid. P. 27.

haviour or action as an activity with an aim. "Acting with an aim", says Dewey, "is all one with acting intelligently. To foresee a terminus of an act is to have a basis upon which to observe, to select, and to order objects and our capacities ... A man is stupid or blind or unintelligent - lacking in mind - just in the degree in which in any activity he does not know what he is about, namely, the probable consequences of his acts."(1) This is because Dewey believes rightly, as Köhler does, that when the goal is foreseen it gives direction to the activity and limits the number of errors when proceeding ahead (Pages 24, 26).

To finish with Dewey's educational philosophy or point of view, let us quote the following paragraph which shows that by associating learning with activity and interest with discipline Dewey solved many contradictory dualisms. "Both of these separations", he says, "are overcome in an educational scheme where learning is the accompaniment of continuous activities or occupations which have a social aim and utilize the materials of typical social situations. For under such conditions, the school becomes itself a form of social life, a miniature community and one in close interaction with other modes of associated experience beyond school walls. All education which develops power to share effectively in social life is moral. It forms a character which not only does the particular deed socially necessary but one which is interested in that continuous readjustment which is essential to growth. Interest in learning from all the contacts of life is the essential moral interest."(2)

---

(1) J. Dewey, op. cit. P.P. 120-121.

(2) J. Dewey, op. cit. P. 418.

This is a very brief survey of Dewey's "Progressive Education", which although is supposed just enough to show its kinship and strong relatedness to the Gestalt school, it never exempts the reader, who is interested in education, from studying the original work of Dewey. Actually, all what has been said by Dewey concerning progressive education is in full agreement with the educational implications of Gestalt psychology. Carr, however, in his clever article "The relationship between the Theories of Gestalt Psychology and those of a Progressive Science of Education"(1), shows interestingly the propositions common to both. He exposes this communality in terms of four main propositions:

1. "The concept of education as a process of continuous growth is supported by the Gestalt hypothesis of the nature of learning". This is supported by their concept of "organization and reorganization", by the law of "individuation" and by the law of "closure". Subject matters should be around the natural activities of the child whose experience will proceed from the undifferentiated to the differentiated, to the integrated and well organized.

2. "Prossive educators have stressed the necessity of enriching the environment in order that the child might attain complete development." This is evident in the saying of Gestaltists that the individual responds to a pattern of stimuli and that he acts in a field. Any change in the field will affect the child. Putting the child in a problematic situation will push him to action by the system of tension the so created gap will evoke.

---

(1) Journal of Educational Psychology, 1934, 25, P.P. 102 - 202.

"Learning takes place in response to a need; (b) conscious learning is guided by the purpose or intention of the learner; (c) learning is a creative process, depending upon creation and discovery; (d) Learning enters into life to the extent it is meaningful to the learner." To these four points in progressive education Carr found the corresponding following four: (a) Learning[1] is the organization of perceptual and motor patterns; (b) the law of closure is identical with the endeavor to reach a goal in learning process; (c) Insight is identical with creativeness and discovery; (d) The largest Gestalt the child can form and assimilate is the best learning material for him.

4. "The socially integrated personality is the goal of education." Gestalt psychology does not believe in this dichotomy between the individual and his society; in the ideal sense, they are simply phases of one whole. Since both form one organized whole, it implies that every individual should grow as much as possible in order to make the growth of the whole possibly adequate.

Hartmann, when defining A "good" act and a "bad" act shows the interaction between the individual and society to preserve the wholeness of the whole. "A 'good' act is one which takes into consideration all the immediate and long-distance effects which it may draw after it, and is performed only if it leads to a better group organization ..... A 'bad' act, on the other hand, is one executed out of relation to the setting in which it occurs and thereby inevitably creates tension or conflict between the offender and the society of which he is a 'member'. Society, however, is not absolved of at least partial responsibility, for there must be

---

(1) We shall see sooner, how the Gestalt school conceives of learning (P.187).

something 'wrong' with it that one of its parts should react in a way which defeats its own integration."[1] This Gestalt standpoint has certain inherent advantages, says Hartmann. It is optimistic, rational, just and humane.[2] Wheeler conceives the relationship between individual and society, in a similar way which is very akin to Dewey's conception. Wheeler sees the individual as a figure and society as a ground. They both form a dynamic whole. "Society and the individual", says he, "share in the ethical responsibility for the deeds of man; society because it is the whole from which man derives his moral standards, and the individual, because he is the immediate agent of the deed, executed in terms of his judgment."[3]

So much for the relationship which exists between the Gestalt school and the progressive education. Let us turn now to the other Gestalt implications in the field of general education. We shall begin by the problem of selection and understanding versus overloading the curriculum and covering ground.

Selection

Education suffered too much and still is suffering in this part of the world from what the educators call overloaded curricula. Even when our educators feel the need for an educational reform, they do not see before them but the curricula to add new materials the result of which will be unavoidably memorization, psitticism and bookishness with not enough concern with the total development of personality, or with the actual life. The implications of Gestalt psychology is entirely against such an attitude.

---

(1) Hartmann, "Gestalt Psychology", 1935, P. 274.

(2) Ibid. P.P. 274 - 275.

(3) R.H.Wheeler, "Laws of Human Nature", 1932, P. 116.

Dewey expressed it more than once in saying that the educational reform is of no use if it is restricted to add to the curriculum or subtract from it some subject matters. "The scheme of a curriculum", says he, "must take account of the adaptation of studies to the needs of the existing community life; it must select with the intension of improving the life we live in common so that the future shall be better than the past. Moreover, the curriculum must be planned with reference to placing essentials first, and refinements second."(1) Thus Dewey stresses selection and adaptation of studies to the needs of society (the child is included). Selection of the essentials first of all. But what are these essentials and what are those refinements ? "The things which are socially most fundamental, that is, which have to do with the experiences in which the widest group share, are the essentials",(2) answers Dewey. As to the secondary refinement, he defines them as "the things which represent the needs of specialized groups and technical pursuits."(3)

On the other hand, the whole being more than the sum of its parts, one might think that the more parts (e.g., knowledge)we give to the student the larger part we get. This might be true provided these parts fit into the whole and find their appropriate places; in other words, provided a meaningful relationship exists among them and enables them to fit in the whole, in the functionally organized whole. This means that they should be able to be understood by and actually useful to, the learner.

---

(1) J. Dewey, op. cit. P. 225.

(2) Ibid.

(3) Ibid.

Unfortunately, the education in this part of the world, does not emphasize understanding, assimilation and reorganization and productivity as much as it emphasizes covering ground and memorizing facts. In other words our education is still after the "bundles theory" rather than the "Gestalt theory". The intelligent educator or teacher is he who emphasizes understanding and who is capable of selecting the essentials and the principles and thus safeguards his students from being lost among heaps of unrelated and unfunctional knowledge and from being under such a tremendous stress of work that they become just like machines, lacking originality and creativity, and far away from life and reality.

Education for Reality

Very much connected with what we have just been saying is what Lewin calls "Education for reality". The reader can recall Lewin's levels of reality and reality. The level of unreality is a soft and easily movable medium; it is the land of dreams and air castles. "Unreality", says Lewin, "is not limited to things of thought: an action may also be unreal. The child in the Kindergarten who has been forbidden for some reason to draw, watches the other children draw or strokes the crayons". Whenever the child fails in the actual life situation he resorts to the level of unreality. The great danger lies in the fact that sometimes, especially as a result of inconvenient teaching conditions or methods, the child remains unable to make the separation between the two levels. He might remain confused even in his adolescence and adulthood. That is why Lewin says that "the development of a level of reality which shall provide a sound basis clear through to adulthood requires that the free life-space of the child be not too small".(2)

---

(1) R.Lewin "A Dynamic Theory of Personality",1935,P.174.
(2) R.Lewin. op. cit. 178.

This means that his needs should be adequately satisfied and not too much frustrated, otherwise the child would fly into unreality or rather be afraid of or unable to face reality. The intelligent teacher would allow the learner child a freer life-space and would encourage him and guide him to solve his problems, which should presumably be commensurated with his level of intelligence and capacity. "Only in a sufficiently free life-space in which the child has the possibility of choosing his goals according to his own needs and in which, at the same time, he fully experiences the objectively conditioned difficulties in the attainment of the goal, can a clear level of reality be formed, only thus can the ability for responsible decision develop."(1) This type of education and not that type which consists primarily of stuffing the mind by unrelated pieces of knowledge with no practical value or a child-accepted goal, that we need in our country. This does not mean at all that the child should not fail in any one of his trials, or he should not be frustrated anyway. No, for this is impossible first of all and for his personality does not develop if no failure and no frustration are to take place from time to time and in a reasonable way. "Today", says Brown,"we believe that it is due to the frustration of drives toward goals that the personality has its development."(2) This viewpoint is also held by Muse who says:"Human personality develops as a result of striving for equilibrium, both within the self and between the self and the social environment; each personality trait is developed during the process of resolving states of equilibrium."(3)

---

(1) Ibid. P.179.

(2) J.F.Brown,with col.of K.Menninger,"Psychodynamics of Abnormal Behavior", 1940, P.20.

(3) Maude B.Muse,"Guiding Learning Experience",The Macmillan Co. New York,1950.

Learning

Learning is another important contribution of the Gestalt psychologists. They studied the process of learning in both the human beings and animals. Consequently they consider the learning process as a process of growth and maturation, as say Freyer and Henry.(1) Learning, they add, is conceived of as "a process of selection ---- guided by the insight."(2) In other words it is a process of organization in which the essential factor is perception or insight without which the gap between the actual situation and the goal is rarely bridged. Learning, being considered as a process of growth it follows the law of growth which proceeds from the undifferentiated to the differentiated. In this connection, Hartmann says: "...The life cycle of all organisms, including man, reveals a progression from a relatively undifferentiated, homogeneous stage to a more elaborate and internally differentiated condition. When this activity occurs with the perceptual controls of conduct we call it learning."(3) When we see a normal man's face for the first time, we usually get a general picture comparatively undifferentiated. Later on when we stay with him a longer time, his face will "break down" and more differentiation will take place: straight nose, brown eyes, clear skin etc.. These parts "pop out" of the whole face which we saw at the start. Nevertheless, the face is the first face. The fact that wholes remain wholes, says Hartmann, shows that integration is preserved during the process of differentiation.

(1,2) Doublas Freyer and Edwin R.Henry, "An outline of General Psychology", Barnes and Noble, inc.,New York,1937, P.114

(3) Hartmann in the "Fourty-First Year Book, Part II, 1942, P. 202.

The educational implication of this fact is that the intelligent teacher should lead the students to see "differences where formerly they saw only likeness or ... to perceive likenesses where others discern naught but differences."(1) This will help students to gain deeper insight into what they learn and ultimately to be able to transfer it and make use of it in their various enterprises of life.

Let us now try to study from a Gestalt standpoint mainly the whole process of learning from the beginning to the end or rather until plateaus are reached.

Learning begins with the determination of a learning goal. When the goal is set and admitted by the learner it becomes an area of low potential upon which all the energies of the organism readily converge. Thus with this particularization of a learning objective, the learner's activity begins in the direction of the goal. Then learning proceeds passing through one of these four interrelated ways namely: (1) differentiation, (2) assimilation or expansion, (3) gradation, and (4) redefinition or reorientation.(2) Let us examine briefly each of the four ways:

1. - Learning through differentiation is "characterized as a process of discovering complexity in a perceptual pattern which at first was perceived as a relatively unstructured but unitary whole."(3) This is just like the explanation afforded by Hartmann as we have just seen.

---

(1) Hartmann, ibid. P. 203.

(2) Hartmann, "Gestalt Psychology", 1935, P.178.

(3) R.W.Frederick, C.E. Ragsdale, Rachel Salisbury, "Directing Learning", D.Appleton - Century Company, inc. New York, 1938 P.39.

2. - Learning through expansion means that the learner after discovering the complexity in the perceptual pattern, will later on make his whole more structuralized and more organized.

3. - Learning through gradation: "Gradation involves establishment of ability to respond to minute degrees (gradients) of some quality; degrees which vary almost imperceptibly between 'poles' which represent extremes."(1) When the infant, says Muse, learns through meaningful experience that "up" is the opposite of "down" and "good" is the opposite of "bad" he has gained more than a vague perception of the meaning of two opposite words. He has rather established a new perceptual mental Gestalt in which these two words represent extremes or "poles", between which degrees or gradations of the qualities later may be established. This ability to respond to a gradient or scale (such as up - down, big-little) is the "true basis of all genuine transfer of training, and it is probably more than accidental that intellectual discrimination is also based less upon the absolute data of sense than upon the pattern of arrangement."(2) This is quite in agreement with Köhler's experiment with chickens. Köhler taught a chicken to choose the darker of two gray plates of food. Then the chicken was given a pair composed of the former dark grey and another still darker one. The animal selected the new darker grey, thus reacting always to the darker of the two. This fact shows that the animal perceived certain relationship between the two greys and hence its choices had throughout been made relative to the pair of greys.(3)

---

(1) Maude B. Muse, op. cit. P.242.

(2) G.W.Hartmann, "Gestalt Psychology", 1935, P.178.

(3) Willis D.Ellis "A Source book of Gestalt Psychology", 1950, P.60.

4. Learning through redefinition may be illustrated by the "varying reactions made to ambiguous figures: nothing is added or subtracted in making these transformations, but the same lines and angles enter into different patterns through the re-orientation of the figure. Presumably shifts in viewpoint on controversial topics as a result of prolonged reflection may be accounted for by this mechanism."(1)

In all the four ways of learning the element of perception is essential; seeing relationships is the key to learning which proceeds mainly through insight and not through trial and error. The trial and error hypothesis conceives of learning as a succession of movements which leads to a solution. This succession is "as accidental as the winning number in a roulette."(2) There exist no intrinsic relationships between the parts of the acts; they are put together in a purely external way. But how does learning take place therefore ? - Between these random movements there is a selection of the correct responses and elimination of useless movements. The pleasure or pain, or rather the satisfaction or dissatisfaction accompanying these reactions serves to "stamp in" the right behavior or "stamp out" the wrong. This account has not been admitted by configurationism which believes that "improvement in efficiency goes hand in hand with an increased insight into the nature of the task"(3) and not with an increased repetition. It has been shown that repetition which leads to the solution is not a mere duplication of exactly the same movement, but only the same general kind of behavior.

---

(1) Hartmann, op. cit. P.178.

(2) Ibid. P. 162.

(3) Hartmann, "Gestalt Psychology", 1935, P.169.

Experiments and observations show also that a cat which succeeded to get out from a puzzle box by pulling a string with its foot, may upon another occasion pull the string with its teeth although the latter activity has never been exercised. Sheer repetition is fruitless, says Wheeler. "Drop a ball a million times and it will not fall more easily the last time than the first". This cannot explain how the first learning takes place. Even "the supplementary law of effect ... suffers from the defect that the reward or punishment often occurs after a whole series of movements, some appropriate and some inappropriate, have been executed, so that it is difficult to see how any retroactive influence would help the learner to know which unit should be retained and which discarded."(1) Instead, configurationists explain learning in terms of "growth in insight derived from the properly-timed environment stimulation of a maturing organism."(2) Thus they pointed out to the important process of maturation, which enables the learner to master the situation and see relations, and without which learning fails to take place. "That is why", adds Hartmann, "concentrated learning is so inferior to distributed learning - the 'rest' or recess periods are as important as the practice sessions!"(3) This is similar to the known saying "we learn to swim, in winter and to ski in summer". In other words learning requires: 1. maturation. 2. insightful organization. 3. Repetition or drill. As a matter of fact, the babies do not walk until a certain age and then within a short time they are able to run all about the house. "When the walking pattern is finally integrated it is done swiftly indicating

---

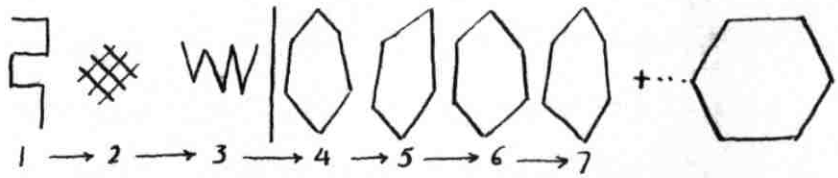
(1) Ibid.

(2)(3) Hartmann, "Gestalt Psychology", 1935, P. 75.

that once the organism acquires the 'feel' of the act and has otherwise matured, the rest is a matter of smoothing off the roughtspot in the performance."(1) Thus the role of repetition and drill comes later to smooth off the irregularities.

Let us conclude our discussion by giving the act of swimming as an illustration of what we have just said. Suppose that this act is done "perfectly" when a structure like a regular hexagon has been established. The phases in learning how to swim will then look like this:(2)

Before the swimming act be done, the organism must be capable of performing some of



the subactions which it includes. These may be represented by the six lines of drawing 1, 2, and 3, just from the start, the learner creates certain "wholes" in which the six components of the full act may appear. Then the learner proceeds forming, through insightful trials, more "organized wholes". The black bar in the figure represents this critical point, e.g. formation of somehow organized hexagon. No matter how poor this hexagon may be, the learner is on the road to success. Concretely, says Hartmann, this means that the beginner can swim a few yards even if this is done unorderly enough and with great exertion.(3) The process will culminate later on in the "ideal" stage of graceful and effortless performance. "All learning ---" Hartmann concludes, "is a redistribution of energy in different patterns than those which existed before an identifiable

---

(1) "The Fourty-First Year Book", Part II, 1942, P.187.

(2) " " " " " , op. cit. P.187, Fig. 9.

(3) Ibid. P.P. 187 - 188.

process of modifiability occured."(1) Upon this point there is agreement in a majority of cases, as McGeoch says. "Learning, as we measure it," adds he, "is a change in performance as a function of practice. In most cases, if not in all, this change has a direction which satisfies the current motivating conditions of the individual."(2) Gates, Jersild, McConnell, Challman also hold the same view; they define learning as "the modification of behavior through experience and training."(3) This is quite logical too, because learning takes place when the learner feels the need to learn, then his behavior will undoubtedly change. Learning is efficient to the degree it affects behavior and creates greater wholes. The educational implication of this is that education and actual life should be one; learning should be functional in order to be able to improve life conditions.

Before finishing with learning we better mention that the Gestaltists see no dichotomy between what is called "motor learning" and "academic learning". According to them, it is always, the total organism that does the learning. This is quite in line with Watson's statement that we think with our entire body. Actually this may be easily observed in the process of transfer of training and insight and perhaps more clearly in the following examples of writing although with difficulty, with the left hand, the elbow, or the foot toe on the sand, or with the head or body by attaching a pointer to them, although we learned only to write with the right

---

(1) Ibid. P. 190.

(2) John A.McGeoch, "The Psychology of Human Learning", Longmans, Green and Co. New York, 1945, P.P. 3-4.

(3) Arthur I.Gates, Arthur T.Jersild, T.R.McConnell, and Robert C. Challman, "Educational Psychology", third Edition, The Macmillan Company, New York 1949, P. 288.

hand. This phenomenon of "cross-education" or transfer shows that the learning was not confined to the organ which was primarily involved, but "irradiated elsewhere - the total nervous system was concerned with the original learning and influenced by it."(1) That is why some difficulty and irregularity will take place at the beginning, but the rôle of drill is to make the task easier and the irregularity smoother.

Plateau in Learning

It has been observed that learning proceeds progressing and forming greater wholes, and is better smoothed through drill until it reaches a level at which no more progress will be achieved, no matter how great the amount of effort and drill is. This phenomenon has been called "Plateau." This is due to the physiological limit or maximum "M" according to Hull. As to the Gestaltists, they account differently for the fact. Wheeler and Perkins, for instance, say that "plateau is attributed to inability to establish an adequate perceptual configuration of essential mental or motor processes because of irradiation of energy."(2) This, irradiation is the responsible factor for the plateau; but what is this irradiation ? - It is the spreading of the energy indiscriminately to all parts of the body, resulting in uncoordinated responses, or possibly complete blocking. The energy instead of being concentrated and directed toward a specific goal, it becomes diffused to the whole body (e.g. to parts which have no direct relationship with the goal).

---

(1) "The Fourty-First Year Book", Part II, 1942, P.184.

(2) R.H.Wheeler and F.T.Perkins "Principles of Mental Development", the Thomas Y.Crowell Company, New York, 1932, P.344.

During irradiation, say Wheeler and Perkins, maturation processes temporarily cease, and if irradiation is prolonged the individual may be left a "dwarfed and stunted personality". Plateaus, therefore, should be prevented or their occurence at least, should be delayed as long as possible. But is it possible to prevent them in the learning process ? According to the Gestalt theorists one is able to progress indefinitely if (1) he was properly motivated, (2) the learning is well matched to the maturation level of the learner (the emphasis here is on suitable methods), and (3) enough attention is given to the proper distribution of work and rest periods.

Motivation

Thus they emphasise motivation in learning; they do not confine this educational motivation to teacher-devised incentives, it rather involves the concomitant preoccupations, feelings and emotions. Wheeler and Perkins suggest that through effective motivation, education does more than permit intelligence to function, that it creates intelligence.(1) When the child reaches a given stage of development and is ready to pass on to a higher level, we as educators, must provide him with an opportunity to grow and to throw further his plateau. We should remember always that the degree to which the child's emotional problems are handled influences also his progress. There is no limit to progress in learning or in whole forming, as long as motivation exists within the learner. It should be clear that the final judge, whether to proceed with learning and improvement or to stop, is at the last analysis the needs or drives of the learner himself. Therefore, as long as this

---

(1) Op. cit. 1932. P. 166.

difference in potential between his needs and his goal exists, the learner is ready to display activity which if well directed and properly channalized, it will be abundently fruitful. It was in this connection that Muse said: " ... Energy exchange within a given motivation pattern takes place from points of high to low potential, through the shortest spatio-temporal interval. In other words, cortical centers which register learner motives and their concomitant emotions become points of high potential; and cortical centers governing the resulting activities constitute the area of low potential. All possible energy will be mobilized to restore equilibrium".(1)

One word more about memory and retention which is much related to learning, should be said before leaving this vital topic of learning. Then we shall proceed summarizing in terms of numerical items the essential implications of Gestalt Psychology in education.

Memory

The traditional psychology used to explain memory in terms of the "re-activation of previously used paths or of "traces" left behind by earlier impressions".(2) When we see a figure for the second time after having seen it for the first time, we are able to recognize it even if its position, magnitude, color are altered. This alteration of the properties of the figure implies the involvement of different neural pathways. Now, in spite of this and in spite of the fact that no object is ever twice reflected in the eye in exactly the same way, the figure is recognizable. Here lies the big difficulty which the associationism could not overcome.

---

(1) Maude B.Muse, 1950, P.P.252-253.
(2) Hartmann, "Gestalt Psychology", 1935, P.171-172.

If the same pathways and the identical "traces" are necessary to recognition how could we ever recognize anything at all ? This is impossible since only in exceptional cases would the same avenues be traversed, as Hartmann says.Thus "the theory is killed by its own specificity."(1) Hence the task of explanation is given to the configurationism. When we perceive an object, for instance, there is a stimulus pattern on one side and an organization of potentials in the nervous system on the other side. Now the recall is explained in that the same organization of potentials and the same stimulus pattern that were present in the original observation begin to function, "except that (1) maturation has taken place meanwhile, and (2) there is only a partial duplication of the original stimulus pattern."(2) Thus the phenomenon of recall is reduced to a phenomenon of perception, in a sense. The following illustration given by Wheeler and quoted in full will clarify the issue: "Suppose you climb a mountain on your vacation. When you return you are able to recall the scenery. You are doing nothing more than to see the scenery with part of the stimulus pattern missing, the scenery itself. When you were actually looking at the mountain you were responding to many more stimuli than the mountain itself. There were your companions, your camping equipment and your conversations with each other, even with yourself. You return home bringing these stimuli with you, including language. Circumstances, then, construct a stimulus pattern partly duplicating the original, the response partly duplicates the original, and we designate it a recall. If the repeated stimulus pattern were as complete as the original, the perception would have been equally as complete. You

---

(1) Hartmann, op. cit. P.172.

(2) Wheeler, "Laws of Human Nature", 1932, P.168.

would then be re-observing the mountain, for, by assumption, it would be in front of you again. Errors in the recall are to be explained in terms of maturation on the one hand, and removal from stimulus-pattern on the other."(1)

Likewise, the American psychologist, Dean Ogden of Cornell holds a similar view vis-à-vis of memory. He has formulated three laws through which the phenomenal revival of memory is explained. These laws are:

1. Law of Preservation: This simply states that "Any perceived configuration, the articulateness of which is marked, will persist for a brief period of time in a state of sub-arousal after the perception is over."(2)

2. Law of Association: this is not the old association of "and-summation"; it is rather the articulated and configuration association. The law states "Whenever a number of more or less discreet perceptions (or ideas) enter into a configuration, they become joined by virtue of their membership in a whole; the members are thereafter held together, not by the external agency of an associative 'glue', but by the transformation which they have undergone in losing something of their individuality and becoming the members of a single pattern."(3) To illustrate the operation of this law Ogden submits the following:

> "When I meet Jones and his wife I am not just encountering two individuals, but I am meeting a 'married couple'. Later when I meet Jones alone, I recall his wife because I perceive him as one of a pair. The pattern is supplemented or 'filled in' and practically becomes what it was upon the first encounter by virtue of the recollection of the missing member. If, however, the 'context' in which I meet

---

(1) Wheeler, op.cit. P.P.168-169.

(2) Hartmann, 1935, P.175.

(3) Hartmann, op. cit. P.P.175-176.

Jones later is such that I react to him as an 'individual' only, or as a member of some other configuration, such as a team, society, etc. to which he also belongs, then I do not recall his wife."(1)

Thus when a whole is formed mainly by two parts, the seeing of one of them would make the whole incomplete, this incompleteness will revive the other proper part so that by the articulation of the two parts the closure is achieved and the whole, due to the intrinsic relations between the parts, is formed. It should be obvious here that any other part will not do, because only with the proper part the "goodness or prägnanz " of the whole is achieved. This might be also illustrated in the everyday forgetting. Suppose you are trying to recall a word or a name which you like to report to your friend. Any other word or name which might be offered by your friend - in trying to help you - will be rejected by you and you will remain under tension until you get the real word or name. Why ? - because your organizational whole is not formed "pregnently" without that missing part. It was in this connection that Wertheimer said: "Memory ... is concerned primarily with the whole properties and structural unity of the thing remembered. Memory process and 'experience' do not consist in a bare sequence of events each essentially alien to all the rest".(2)

3. Law of Practice: This is the third law; it defines the rôle of practice as "that of furnishing conditions favorable to a closer articulation and consequent fixation of whatever would otherwise be loose and inarticulate in form."(3) Thus the service of practice is to facilitate and to promote articulation into a whole. Even the artificial units such as nonsence-syllables can enter, by practice

---

(1) Ibid. P. 176.

(2) Willis D.Ellis,"A Source book of Gestalt Psychology",1950,P.16.

(3) Hartmann, op. cit. P.176.

into a variety of configurations of order, rythm, appearance, and sound.(1)

Thus we can conclude that the explanation of memory from a Gestalt point of view makes the old explanation by "traces" unnecessary. What are these "traces"? How are they preserved in the brain ? What happens to our memories between an experience and its recall ? What could we recall if we have only paths or "traces" in our brain ? All these questions become out of place if we adopt the Gestalt explanation of memory based upon the "closure" and "prägnanz" and the dynamism of the brain.

Let us now try to enumerate some pedagogical principles and implications which satisfy the Gestalt school of psychology. This does not mean that these principles and implications are absolutely restricted to Gestalt psychology. Other schools of psychology might agree upon them also. The important thing is that these principles and implications are implicit in and directly deduceable from configurationism.(2)

1. "Begin with the whole situation first then proceed to the parts." By this, Hartmann, means specifically three things:(a.) when teaching Afganistan says he, begin by clarifying its position with respect to its Asiatic neighbors; present it in a context. (b.) stress the essentials of an act and not its trimmings. Here comes the essential rôle of selection we have spoken about. (c.) Place every experience, be it old or new, into its larger setting. Actually, this principle has wide applications in teaching different subject matters. The "direct method" in teaching languages, for instance is in line

---

(1) Hartmann, op. cit. P.177.

(2) We draw heavily in these principles upon Hartmann in the 41st Year Book. 1942, pp.205-208.

with this principle. In the modern schools they no more begin with nouns and their exceptions, then adjectives, then verbs and finally sentences.[1] Even on a more elementary level, the "global" method of teaching reading, spelling, and writing, has been proven, in most of the occidental languages, to be much more beneficial than the old method which used to begin by the single letter. Even in Arabic, the writer was convinced that the Arab-speaking child was able to understand, larger units such as sentences, phrases, and words, long before he was able to segregate individual letters and syllables. Unfortunately the Arab teachers are not yet fully aware of the superiority of the global method; they are still sticking to the old analytical and phonetic methods. There is, however, a new radical movement in this direction, although it is not yet grown enough to gain over the old ones already established.

When dealing with this subject Lewin said: "To write a paper containing hundreds of letters does not mean repetition and therefore does not lead as quickly to satiation. This is one of the reasons why the method of writing and reading by learning sentences or words is superior to the older method of learning letters. The modern primer uses stories which 'progress' although they are composed of relatively few words and elements. In this way positive motivation for learning to read is created or set up."[2]

The same may be said to mathematics. "An integrated course in general mathematics appears to yield a greater increment of

---

(1) Comenius advocated this method since 1631, and Decroly also in 1927 advocated it for teaching both the normal and the abnormal.

(2) "The Fourty-First Year Book", Part II, 1942, P.234.

understanding than a series of separate courses in algebra, geometry, trigonometry, etc."[1] History was also taught by the reign and according to the chronological order from the ancient world up to the present. The trend is now to begin with the present situation (e.g.,teaching history backward).

Geography in the modern schools is taught beginning from the regional geography in which each region is considered as a thing to somehow "belongs together," a thing that has a unity, a thing that means something as a whole, as Fairgrieve puts it.[2] Thus from the context of regional geography each region gets its character and its spirit, for Fairgrieve maintains that "There is a spirit of a place as well as Zeitgeist, the spirit of a time. Regional geography consists in the study of the spirits of places".[3] Modern geography is no more that which deals with boundaries, capes, bays, mountains, rivers, and towns independently. "A man's character is not merely a mechanical compound of this, that, and the other quality; one may analyse a character if one pleases, but one cannot take these qualities which one distinguishes in a man and put them together and say they make up the man. One cannot even put together the results of a dissection in an anatomical theatre and call it a living man. In the same way we must remember that though we may analyse the character of a region, yet the character of the region is something more than the results of that analysis."[4]

2. <u>"No two items, no matter how far apart they may seem to be, should be learned without asking what is the nature of the relation between them."</u>[5] The intelligent teacher should help the student to form

---

(1) Hartmann, op. cit., P.263.
(2) James Fairgrieve,"Geography In School",Univ.of London Press Ltd., sixth Edition, 1949, London, P.38.
(3) Ibid P.38. (4) Ibid. PP.38-39.
(5) "The Fourty-First Year Book", Part II, P.205.

within himself a habit of asking himself, every time he learns an item, how is this one related to his repertoire and how is it possible to be put into use. An attitude to see events and properties in their togetherness, should be developed in the child.

3. Learning is most fruitful and most functional when it is motivated by goals established or accepted by the learner as a result of his needs and drives. Actually, the Gestalt theory maintains that "understanding and invention or discovery occur in accordance with the (principle of closure) ... Consequently, the school child is never really passive, for every act of comprehension is something creative. The 'born teacher' is simply one who presents and adjusts incomplete patterns in such a way that the proper closures are most readily made."(1)

4. Learning process to be complete, three stages are required; a. impression, b. unification and correlation, and c. expression.

5. "Project learning and systematic course learning are not irreconcilable antinomies but appropriate to different levels of maturity in the content involved."(2) Thus content and method should be made to suit the learner's level of growth and maturity. It follows also, as Wheeler says, that "the same discipline will not work for all children of a given age, nor will it always work for the same child at different time".(3)

---

(1) Hartmann, "Gestalt Psychology", 1935, P. 184, footnote.

(2) "The Fourty-First Year book," P.206.

(3) R.H.Wheeler, "The Science of Psychology", 1940. P.188.

6. "Motivation follows the principle of functional autonomy, i.e., any act, once begun, is carried forward by its own incompleteness and future reference to other emerging goals without constant reliance upon the original impulse."(1) The important thing is to make the student feel genuinely the need of doing a thing, then when he begins he usually will not stop before reaching the end. The interrupted activity is unpleasant.

7. "Interest depends upon some congruency between the activity or stimulus and the existing personality organization of the learner .. and without this condition, instruction should not be attempted if it seeks to be efficient."(2) As a corollary of this we can say that when the learning is pursued whole-heartedly by the learner, it will proceed in terms of Wheeler's laws of "Least action" and "Maximum work". Within the limits of the learner's comprehension of the learning goal he will exert maximum effort to attain it and this effort will follow usually the most direct route possible to it.

8. "The conditions of learning should provide opportunity for the continuous modification and change of the pattern of response."(3) Change, as a matter of fact, is the main characteristic of growth. Through modification or change new patterns of stimulation enter into action and cause some disequilibrium in "the series of learner-environment energy systems". Learning, will be as a "by-product of imperfect adjustment, it (will be) initiated and energized - motivated by disequilibrium resulting from learner recognition of some need or lack."(4)

---

(1) "The Fourty-First Year book", 1942, P.206.

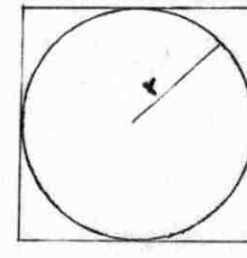
(2) Ibid. P.206-207.

(3) "The Fourty-First Yearbook", op. cit. P.207.

(4) Maude B. Muse, 1950, P.269.

9. "Parts and wholes are never absolute, for every whole is a part to some larger whole and every part is a whole to some smaller part."(1) That is why authentic integration of learning proceeds in terms of whole-to-part relationships. As a matter of fact, when parts are apprehended as unitary wholes which retain relationships to the primary whole and through it to each other, then deep learning takes place and transfer is quite possible.

10. "Transfer is real and positive and has no limits save those imposed by the nature of the world in which the pertinent configurations are found, i.e., some patterns occur frequently and others rarely."(2) In this connection, Muse says that to have transferable learning the following characteristics are required; "(a) focalization of the learning material must be specific and challenging, (b) Organization must be purposive and functional, and (c) the learning unit must possess learning-recognized continuity with previous learner experiencing and arouse learner awareness of its potential contribution to future learner experiencing."(3) Here is an example of the phenomena of transfer and insight as given by Hartmann: "Find the area of the circumscribed square when only the radius of the inscribed circle is known ?"

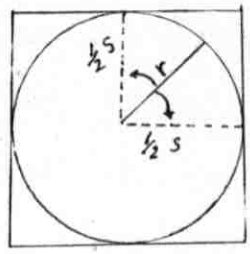


Most persons, says Hartmann, are blocked in their effort to find the solution largely because they have not established the "habit" of seeing things in variety of ways. In this figure, for instance, they have to "re-structure"

---

(1) "The Fourty-First Yearbook", 1942, P.207.
(2) Ibid.
(3) Maude B. Muse, 1950, P.267.

the pattern before an answer is possible. As long as the reader sees the radius as only a radius with no relation with the square, he is far from the proper solution. But as soon as the radius is perceived to be one-half of the side of the circumscribed square, the problem is solved. Had the radius been horizontal or vertical, the reader would have more easily solved the problem. The difficulty lies in re-structuring or in transferring the previous learning into the actual one. Thus the reader would see that the area of the circumscribed square is twice (r) multiplied by itself or $A = (2r)^2$. (1)



It is this kind of learning built upon understanding and insight (i.e., transferable) that every intelligent teacher tries to help his students to get. This occurs easily by emphasizing understanding, seeing more relationships, and forming larger wholes through insightful thinking and self activity.

11. "Present learning is less dependent upon previous experience and the adequacy of earlier skills and information than upon the clarity, field properties, and excellence of organization of the learning material itself."(2) This implies that the method of teaching is of prime importance. The alert teacher would prefer the method which helps to clarify the field, to form excellent organization and at the same time to revive previous experience. However, there is no method which can be separated from its user. It is a known fact that the best method in the hand of a poor teacher is much more inferior to a poor method in the hand of a good teacher. There is

---

(1) "The Fourty-First Yearbook", 1942, P.P.193-194.

(2) Op.cit P.207.

usually this adaptation of the workman to his tools.

12. "The organism's purposes decide for it when it shall consider anything as learned."(1) As long as the learner feels that his need is not satisfied or his goal is not attained, he is able to display interested activities in the goal direction. The human being possesses, in fact, enormous potentialities which can be put into work through that chimerical agent of motivation. Out of the learner, the brilliant teacher can get as much as the amount of motivation he can create in him.

13. "Errors are usually testimony that the task is too severe for the learner's level of maturation and that material should be so graded or paced that a minimum of mistakes occur."(2) This is quite obvious, and a large number of mistakes are likely to discourage the learner and make him so unsure of himself that he might quit the field.

14. "Orientation, general education, and survey courses harmonize best with the nature of early mental development, but that specialized courses are justified when growth has proceeded sufficiently via differentiation."(3) It has been shown that the measurable abilities of the child are much highly intercorrelated at the early stages of development than later stages. That is why it is quite logical to give general education at the beginning with good orientation, altogether with full respect to the individuality of the learner. Then more specialized courses are justified. Thus education and growth are viewed as one process.

---

(1) Op. cit. P.207.

(2) Op. cit. P.207.

(3) Op. cit. P.207.

15. "Forgetting is an active process, probably involving the loss of an item's place in some memory frame work."(1) This statement implies the necessity of strengthening the ties of items and organizing as good as possible the total wholes.

16. "The more systematized our experiences are, the less likely we are to forget any of them."(2) This is a corrolary of the previous item. The "organic unity", says Muse, "is a central concept in all creative thinking in the world today and consequently should become the central concept in the educative process."(3)

17. "Much rather than many should be the pedagogues' curricular watchword."(4) It is not the quantity which is to be strived after but rather the quality. When planning a curriculum or applying it we should not be after the dismembered items but rather after the meaningful wholes, not after covering ground but after understanding and functional learning.

18. "Pupil choice rests upon the fact that each human body is an independent energy system with its own special requirements and such preference should dictate educational policy save where the organism itself or other organisms would clearly be damaged thereby."(5) Individual differences should be respected as long as they do not do any harm to each other. Actually from these differences the strong and evolving whole-society-emerges.

19. "Values and facts are both realities in human experience and interwine in every situation we face."(6) Thus the intelligent teacher

---

(1)and (2) Op. cit. P.207.

(3) Maude B. Muse, 1950, P.267.

(4) "The Fourty-First Yearbook", 1942, P.207.

(5) Ibid. P.208.

(6) Ibid.

will direct the efforts of his students toward better living and ethically higher standards.

20. The total personality of the child is to be educated and cared for and not just the mental side of it. And just like every side of personality should be cared for, in order to get a wholesome personality so every member in a society should be given the opportunity to grow if a wholesome society is aimed at. Equality of opportunity is necessary for the growth of both individual and society, beesuse they are phases of the same whole as we have seen.

These are only a few implications of the Gestalt psychology; these principles should work all together to conserve the goodness of the whole. Many other principles can be deduced also, but this field is not yet fully explored; only recently the attention has been called to its importance. It is hoped that in the coming decade much more progress will be achieved in this relatively new field. Nevertheless we can conclude by saying that Gestalt psychology has influenced education in a.aims, b.contents, c. methods and d. values.

Let us now, just before leaving this vital topic, try to look in the light of the foregoing discussion, at our educational systems in the Arab Near East. I should confess here that the task is big and perhaps a well selected committee is needed to take it up. Nevertheless, I shall try to deal briefly with the educational problems in Syria, believing that, although every Arab country has its particular problems, they all share many similar problems too. These problems may be considered as Gestalten or wholes. The limited space and time compel me to be satisfied by some problems or Gestelten only. The following are, perhaps, some

of the most important:

1. The Student and his home.

2. The student and the teacher or the school.

3. Teaching and the syllabus.

4. School, teachers and community (including Government).

5. Equality of opportunities as a greater Gestalt.

These are the Gestalten with which I shall try to end this chapter. Perhaps it is useful to warn the reader from the beginning that although these problems form segregated wholes, they are actually only sub-wholes of the biggest one which is "life and growth" in the full meaning of the words. Let us begin now with the first Gestalt, namely the student and his home.

1. Student and His Home

At the age of six our elementary schools receive usually the child coming directly from home. What home ? Generally speaking the majority of our homes are poor both economically and educationally. The fathers are generally illiterate and more than 90% of the mothers are so. There are still in our community homes in which no chairs and tables are introduced. Their small children when sent to schools are the first to introduce a reader. These homes still live just like they lived five hundred years ago. From what we have just said the reader can estimate the situation of the child reared in such an unstimulative environment. All this is to say that the majority of our children come to schools with a very poor background. Comparing these children with their age-mates in Europe or America who come usually to elementary schools from Kindergartens or mere homes with a good verbal, numerical, and scientific repertoire, we can see how difficult and hard the task of our schools is. Later on, when the school achieves his task

which is most of the time hindered by the home situation, and when the child is educated to an extent does it fit again in his family or community. I do not know whether, fortunately or unfortunately the acuity of this problem is proportional to the amount of education the child gets. The more is he educated the more he is misfit in the community and the less he shares in forming the whole. The writer knows of many instances in which the ignorant parents stopped the schooling of their children because of this gap which separated the parents from their children. "I do not want my child to criticize everything and not to be satisfied with my way of life, because he attends the school"; this was the motto of such parents. Is education good ? should the school alone bear the burden of reform and enlightenment ? Should the reform be restricted to the school or should it involve society as a whole ? These are very urgent questions to be answered decisively.

2. Student & Teacher.

Very much related to the first question is that of the student-teacher whole. The teacher should admit the child as it is and then try to help him develop. The alert teacher should anticipate every child problems and know every child's background in order to be of a real help to him. Let us admit here that this student-teacher Gestalt is a very poor one in this part of the world. Teachers are not well prepared and not well paid; no wonder therefore if they have no other aim beside their giving a lesson and returning home. Students rarely feel that teachers are to guide and help them. They rather have an antagonistic attitude toward one another. Misunderstandings are not unusual in all the stage of education. Unfortunately we have not yet formed what I call educational traditions. No wonder, we are beginning our life anew,

and we are striving to stand on our feet. Difficulties are natural things to be found in the way of our progress; surpassing difficulties is natural too. The teacher, we must mention is the nerf of progress. Does this imply that we should provide our schools with intelligent, trained and academically well prepared teachers ? Money must not stand in the way.

3. Teaching and Syllabus

This is another Gestalt lacking in "closure" and "prägnänz". In this part of the world, it seems, our aim of education is not quite clear. This is why every time our educators feel the necessity of reform they go directly to the syllabus as if it were the "Arian String". Consequently the syllabus is so overloaded and the curriculum is so away from life situation that the life in our school is not attractive but rather repulsive. The teaching is bookish and superficial. The teacher is always in a hurry to cover ground - even at the risk to understanding and constructive analysis - and the student is in a hurry to memorize and prepare for the examination. Unfortunately syllabus and exam form a Gestalt - this is an example of a bad sub-whole which prevents the occurrence of "prägnanz" - while students - teacher - and syllabus should form the Gestalt in all its goodness.

As a matter of fact, our entire education turns to be a process of preparation for exams. The elementary cycle prepares for the "Elementary Certificate" exam; the intermediate for the "Brevet"; and the high cycle for the "Baccalaureat" which leads only a very tiny minority of the students to the university. Are we justified to make the aim of our education preparation for exams and ultimately for university ? What shall we do with those who do not enter the university ? Is entrance to university an aim by itself ? On the

other hand, what is the use of these examinations ? are they used for selection and guidance ? are they to help students and show them the lines of their interests and direct their activities into useful ways or vocations ? Unfortunately they are means to eliminate the majority of candidates. It is not unusual to have only 10% or 15% of the candidates pass the "Baccalauriat" examinations. What about the 90% or the 85% of the students and what about the money spent for them ? Can we consider such teaching a success ? Where are the tests and measurements whereby we can select and guide our students and where are our special schools and our electives ? If our nation is to progress we have to make use of all our potentialities and efforts through positive selection and scientific guidance and not through elimination. Why put both the teacher and the student under the stress and strain of the overloaded curricula ? Why not allow them to grow and produce through free activities and supervised and guided studies ? Why neglect the extra curricular activities and physical, social and emotional education ? Syllabus should be a means to growth and not a handicap of growth. The growth of the well rounded child and not covering ground should be in the foreground. The system of examinations - enemies of students - should be reconsidered, and the syllabus should be less ambitious and more wise then a new structured Gestalt with its beauty and goodness will emerge.

4. School and Community

It goes without saying that to have an effective education, school and community should interhelp. It has been said also that the school has two main functions concerning community: (1) to perpetuate it and (2) to reconstruct it and make for its progress. As a matter of fact school and community form one segregated Gestalt; any progress or shortcoming in the one will affect surely the other.

That is why both should be integrated and any reform which is restricted to one of the two only is an incomplete reform. The school should be a piece of life, a refined community in which children live and grow continuously, and in which they acquire skills, habits, and attitudes which they will ultimately strive to realize them to a fuller extent in the evolving society.

From the foregoing discussion one can think that the school being a refined society, therefore there will always exist a discrepancy between school and society. This is true; it is in this discrepancy that lies the seed of progress and evolution to a large extent. Being more refined the school naturally has to lead, but itshould never lose touch with society it leads; in other words the gap between the two should not be too big to be impossible to bridge or even to think of bridging.it. We as educators we should not understand from this that the school should stop from progressing or should retrogress to be on the same level with society. Thus, to me, the dilemma before which most of the educationists in the Near East stop or go astray, is clarified if we believe in the intrinsic relationships between school and community and that any reform has to begin both in school and in society at the same time. No matter how good you make the school and the curricula, your reform will remain limited unless it involves the whole society as such. The Syrian boy or girl when he or she leaves the school to face the social reality is very severely shocked, frustrated, and sometimes lost. If any process of adjustment is to take place, this will be at the expence of his ideals and attitudes already formed in school. Why ? This is because that big discrepancy between school and society, and also because most of the so-called reform is restricted to

schools. This is perhaps because it is easier to pretend doing any reform in school than in society. Any real, genuine reform should aim at raising the standard of living of every individual and at minimizing as much as possible the class differences which is the anti-thesis of democracy. Unless this is done, no matter how you teach your student to respect labor and laborers and no matter how you teach him to be ethical and a good citizen, your teachings will not cross the walls of the school. School and society should be free and capable to help every individual to release his energies, to make use of his potentialities and to create within himself new potentialities whereby he participates in the progress and the well-being of his fellowmen. In one word School and Society should be fully "democratic".

A special care should be taken of two sub-wholes of this Gestalt namely the teacher in a school and the teacher association on one hand, and community and the whole society on the other. It should be clearly accepted by every teacher that the interest of the learner is to be put in the foreground. Thus every single teacher would complete and supplement the work of his colleague and not to contradict it. As to the different communities they should have a common meaning of education and democracy and should not ask their schools to educate blasly for race prejudices and class distinctions. This implies, of course, the problem of equality of opportunities which we shall take up now.

5. Equality of Opportunities.

This equality, although mainly educational, it involves also economic, political, social etc... All these form also a greater Gestalt. Actually it is very difficult to achieve educa-

tional equality, if equality in the other opportunities is disregarded. Even making education free and compulsory, examinations, curricula and schools the same for everybody, yet this will not achieve the educational opportunity as the psychologists and educationist conceive of it. It is not equality to open the school for everybody nor even to give book,food and clothing to the poor. The parents in our country need the help of their children, they need them to work and make money whereby to support the family.

It is not equality to give the same exams to the rich as well as to the poor, the former having all the comfort and every kind of help from that of literate parents to that of private teachers, and the latter deprived of all these privileges and over all is required to do some work as soon as his daily schooling is over. Furthermore, the ignorant and needy parents cannot take into consideration the situation in which their child is living, or must actually live as a student; so it is most likely that the child will fail to succeed and he will end to be like his parents usually. And suppose that the child is a success, his parents cannot wait for him until he graduates; consequently as soon as he finished the compulsory age he leaves the school for ever. The value of the economic factor is obvious now and its effect is clear. The same thing may be said to the social and political opportunities. They are so closely interrelated that any dichotomy will make the problem less adequately determined.

Therefore, we can conclude that our educational problem or growth problem in the Arab Near East in general and in Syria particularly is a large Gestalt in which the previous five points are sub-Gestalten. Some are more articulated and higher integrated than the other, but all are interdependent and dynamically

intersecting. Any genuine reform in our life should aim at keeping some kind of equilibrium among the sub-wholes, thus the prägnanz of the greatest Gestalt is expected. As a matter of fact any change in one of these five Gestalten affects the whole system. Hence our reform should involve all of these, if our aim is to have that beautiful good Gestalt. Otherwise, whatever we do, if it is restricted to one or to few of them, we remain in a stage which I call "patching", and our so-called reform will not be more than patch-work-like. To this the Arab reader might say that we cannot afford to fulfill all this at the present conditions. Much money is needed and we have no such amounts; feudalists and imperialists of all kinds will resist such a genuine and general reform; and lack of experts will hamper this plan. The answer to this is that we should believe deeply that to every problem there is a solution and it is up to us to find it. As to the political problem particularly, although it is related to our Gestalt, the limitation of the space will exempt us from dealing with.

B I B L I O G R A P H Y

1. Anastasi,Anne and Foley,John "Differential Psychology", The Macmillan Company, New York, 1949.

2. Aveling, Francis "Psychology, The changing Outlook", The Arabic Translation by M.J.Ismail and A.M. Hanna, Annahda Almisriyeh Library, 1949.

3. Boring, Edwin G. "A History of Experimental Psychology," Century Co. New York, 1929.

4. Boring, Edwin G. "Gestalt Psychology and The Gestalt Movement" in the American Journal of Psychology, 42, 1930.

5. Brown, J.F. "Psychology and the Social Order", McGraw-Hill Book Company, Inc., New York, 1936.

6. Brown, J.F. with the collaboration of Menninger, Karl "The Psychodynamics of Abnormal Behavior", McGraw-Hill Book Company, Inc. New York 1940.

7. Carmichael, Leonard, editor of "Manual of child Psychology", John Willey and Sons, Inc., New York, 1946.

8. Cannon, Walter B. "Bodily change in Pain, Hunger, Fear and Rage, New York, 1915.

9. Clapaiede, E. "La Genèse De L'Hypothèse Arch. de Psych. XXIV, 1934.

10. Cohen, Morris R. and Nagel, Ernest "An introduction to Logic and Scientific Method, Harcourt, Brace and Company, New York, 1934.

11. Dewey, John "Democracy and Education", 23rd printing, The Macmillan Company, New York, 1950.

12. Ellis, Willis D. preparator of "A Source Book of Gestalt Psychology", The Humanities Press, New York, 1950.

13. Encyclopaedia Britannica, vol. 10, P.P. 316-317.

14. Fairgrieve, James, "Geography in School", sixth edition, University of London Press Ltd., 1949.

15. Frederick, R.W., and Ragsdale, C.E., and Salisbury, Rachel "Directing Learning", D.Appleton-Century Company, Inc., New York, 1938.

16. Freeman, Frank S. "Theory and Practice of Psychological Testing", Henry-Holt Company, New York 1950.

17. Freyer, Doubles and Henry, Edwin R. "An Outline of General Psychology", Barnes and Noble, Inc., New York 1937.

18. Gates, Arthur I. Jersild, Arthur T. McConnell, T.R., Challman, Robert C. "Educational Psychology", 3rd edition, The Macmillan Company, New York, 1949.

19. Gottschaldt, Kurt "Gestalt Factors and Repetition". Published in two papers in the German Psychol.Forsh. in 1926 and 1929, Mostly translated in H

20. Guillaume, Paul "La Psychologie De La Forme", Ernest Flammarion, Paris 1937.

21. Hamley, H.R. "The Yearbook of Education 1935", Published by Evans Brothers Ltd., Russell Square, London.

22. Hartley, Eugene L., Birch, Herbert G., and Hartley, Ruth, editors of "Outside Reading in Psychology", Thomas Y. Crowell Company, New York, 1950.

23. Hartmann, George W. "The Psychology of Learning" 41st Yearbook of the National Society for the Study of Education, Part II, 1942.

24. ___ ___ , "Gestalt Psychology", The Ronald Press Company, New York, 1935.

25. Heidbreder, Edna "Seven Psychologies". D. Appleton - Century Company Inc., New York, 1933.

26. Hilgard, Ernest R. "Theories of Learning", Appleton - Century-Crofts, inc. New York, 1948.

27. Hull, Clark L. "Principles of Behavior", Appleton-Century-Crofts, Inc. New York, 1943.

28. Journal of Educational Psychology, 25, 1934.

29. Kasmer, Edward and Newman, James "Mathematics and the Imagination", Simon and Schuster, New York, 1940.

30. Koffka, Kurt "The Growth of The Mind", Translated by Robert Morris Ogden, Second Edition, Revised; Harcourt, Brace and Company, New York, 1928.

31. — — , "Principles of Gestalt Psychology", Harcourt, Brace and Company, New York, 1935.

32. — — , in the "Encyclopaedia of the Social Sciences", Vol. VI, The Macmillan Company, New York, 1931.

33. Köhler, Wolfgang, "Gestalt Psychology", Horace Liveright, New York, 1929.

34. — — , "The Place of value in a world of Fact," Horace Liveright, New York, 1938.

35. Klineberg, Otto, "Social Psychology", Henry Holt and Company, New York, 1945.

36. Krech, David and Crutchfield, Richard S. "Theory and Problems of Social Psychology", McGraw-Hill Book Company, Inc., New York 1948.

37. Lewin, Kurt "A Dynamic Theory of Personality" Translated by: Adams, Donald K. and Zeuer, Karl E. McGraw-Hill Book Company Inc., New York 1935.

38. — — , "The Conceptual Representation and Measurement of Psychological Forces", Duke University Series 1938, Contributions to Psychological Theories.

39. — — , "Resolving Social Conflicts" edited by Gertrud Weiss Lewin, Forward by Gordon W.Allport, Harper and Brothers publishers, New York 1948.

40. — — , "Principles of Topological Psychology", Translated by Heider, Fritz and Heider, Grace M., McGraw-Hill Book Company Inc., New York and London 1936.

41. London, Ivan D. "Psychologists' misuse of the Auxiliary Concepts of Physics and Mathematics", Psychological Review Vol. 51 No.5 Sep. 1944.

42. McGeoch, John A. "The Psychology of Human Learning", Longmans, Green and Company, New York, 1945.

43. Murchison, Carl, editor of "Psychologies of 1930", Clark University Press 1930.

44. Murphy, Gardner "Historical Introduction to Modern Psychology," Revised Edition, Harcourt, Brace and Company, New York 1949.

45. Murphy, L.B. "Social Behavior and child Personality", Columbia University Press, New York 1937.

46. Muse, Maude B. "Guiding Learning Experience", The Macmillan Company, New York 1950.

47. Price, Louise, "Creative Group work on the Campus", Teachers College, Columbia University, New York 1941.

48. Prothro, E. Terry and Teska, P.T. "Psychology", Ginn and Company, New York 1950.

49. Spitz R.A. "Anaclitic Depression", Psycho-anal. Stud. Child, 1946.

50. — — ,"Hospitalism. An inquiry into the Genesis of Psychiatric Conditions in Early childhood", Psycho-anal.Stud. child. 1945.

51. Thorpe, Louis P. "Child Psychology and Development", The Ronald Press Company, New York 1946.

52. Walterhouse, J.A.H. in "The Yearbook of Education 1950".

53. Wechsler, D. "The Measurement of Adult Intelligence", The Williams and Wilkins Co., Baltimore 1944.

54. Wheeler, R.H. and Perkins F.T. "Principles of Mental Development", The Thomas Y. Crowell Company, New York, 1932.

55. Wheeler, Raymond Holder, "The Science of Psychology" 2nd Edition, Thomas Y. Crowell Company, New York 1940.

56. — — , "Laws of Human Nature", Appleton Century Company, Inc. New York 1932.

57. "Readings in Psychology", Thomas Y. Crowell Company, New York, 1930.

58. Woodworth, Robert,s. "Contemporary Schools of Psychology" First edition, The Ronald Press Company, 1931.

59. Woodworth, R.S. The Revised Edition 1948.

60. Witty, P.A., Jerkind, M.D. "The Case of 'B', A Gifted Negro Girl," J. Soc. Psych., 6, 1935.