

TOWARD A DYNAMIC THEORY OF FEELING AND EMOTION

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TABLE OF CONTENTS.

Acknowledgments.

CHAPTER

I Introduction. Statement of the Problem. (p.1.)

II Historical. (p.5).

III Criteria. (p.10).

IV Methodological. (p.13).

The method and concepts employed in the present investigation. Outline of the field theoretical approach. Five requirements to be satisfied by an adequate theory of feeling and action.

V Theoretical and Experimental. (p.24).

The Organism and the Environment. On the relation of Pleasantness and Unpleasantness to action.

Part 1. A) The hypothesis. (p.31).

B) Experimental. Method (p.31).

General Plan of Experimentation (p.37).

(1) Experiments of the Temporal (p.39).

Relation of Feeling to Action.

(A) Feeling P

(B) Feeling U

(2) Experiments on Quality. (p.44 of feeling.

(A) With 'free' action.

(B) With blocked action.

**(5) Experiments on Intensity of
Feeling (p. 53).**

(A) Increase of Intensity

(B) Decrease of Intensity

(4) Summary of Results. (p. 56).

**A Dynamical Interpretation of
Pleasantness and Unpleasantness (p.58).**

Law of P (p.61).

Law of U (p. 61).

**Part B. On Feeling X; a new type of feeling
discovered in experimenting on
Pleasantness and Unpleasantness. (p.62).**

A) Initial purpose (p. 62).

B) Final Plan of Experimentation (p. 67).

C) Description of Feeling X (p. 67).

(1) Qualitative Characteristics. (p. 68).

**(2) Spatial relation to the behavioural field
as a whole (p. 68).**

**(3) Spatial relation to Pleasantness (P)
in the field (p. 69).**

**(4) Spatial relation to Unpleasantness (U)
in the field (p. 69).**

(5) Temporal relation to Pleasantness (P) (p. 69)

(6) Temporal relation to Unpleasantness (U) (p. 69)

(7) Relation to the activity of the Person. (p. 70)

**(8) Genetic relation of Feeling X to P and U
(p. 70,75).**

**(9) Relation of Feeling X to the
dynamics of the field. (p. 76).**

**(10) Degree of intensity of Feeling
X (p. 78)**

**Interpretation of Tension-Feeling
described heretofore under the
working title, Feeling X (p. 79)**

VI Summary (p. 81).

VII Bibliography (p. 84).

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CHAPTER I

INTRODUCTION

The problem of emotive behaviour rivals in its importance to human well-being the problems of intelligence and learning. Willoughby (1931)* points out that "Probably not even intelligence is of more importance in human relationships than emotional maturity."

In the psychology of emotive behaviour numerous studies have been made under the older atomistic-mechanistic methodology, and relatively few under the newer configurational or Gestalt method, which has some right to be considered the major scientific discovery of the 20th Century. (J. F. Brown, 1935a p.182). When it is asked: Why has the new scientific method, the field theoretical approach, been applied so abundantly to problems of perception, intelligence and learning and so meagerly to the problems of feeling and emotion, (1) the answer is not far to seek. Configurational principles were first brought out in studies on perception by Wertheimer, Köhler, Koffka (Wertheimer, 1912). Further work under the new concepts expanded into the closely related fields of intelligence and learning. Only comparatively recently have they been applied to problems of emotive behaviour, notably

* Throughout the text references to the Bibliography are made under the name of author, and by year of publication, rather than by arbitrary numbers.

(1) A pertinent example may be found in the allotment of space in Koffka's Principles of Gestalt Psychology (1935). Of its 685 pages of text only 16 pages are devoted to the emotions. Yet it is noteworthy that in these 16 pages, the most significant work done under the new methodology is accounted for.

in the work of Kurt Lewin and his students.

"The unsettled state of the psychology of feeling is notorious", said Titchener in his Lectures on the Psychology of Feeling and Attention (1908, pp. 4 and 5).

Lashley (1930) states in his Presidential address to the American Psychological Association: "The problem of emotion is still in such confusion that one can draw no conclusions with confidence". More recently McDougall (1933) complains: "The continuing chaos of opinion about emotion is a reproach to our science and a serious bar to progress" (p.152). But Lashley in his address mentioned above, points out that the difficulties in the field of emotion are to be solved by a psychological rather than a neurological approach. "Psychology is, today, a more fundamental science than neuro-physiology.... the latter offers few principles from which we may predict or define the normal organization of behavior, whereas the study of psychological processes furnishes a mass of factual material to which the laws of nervous reaction in behavior must conform".

It was felt that a psychological approach employing field dynamical concepts might be fruitful in the field of emotive behaviour as it has been in the problems of perception and learning.

The present investigation is a critical and experimental study of the relationship of feeling to action in the human organism as a whole. It attempts to deal particularly

with the relation of the feelings of Pleasantness and Unpleasantness to the activity of the organism. Also, a somewhat precise description is given of a newly discovered type of feeling hitherto uninterpreted in dynamical terms.

Our experimentation was conducted over a period of four years, 1932-36. The first three years were devoted to the investigations of feeling and action, and an additional year given over to the investigation of the newly discovered feeling mentioned above.

Our thesis is:

1) That the traditional atomistic-mechanistic methodology as applied to the problem of emotive behaviour has been fruitless because it is inadequate to deal with the problem of emotion as an organized total process with characteristic patterns that are explainable in the terms of dynamics.

2) That emotive behaviour is organized and follows the laws of organized wholes.

3) That the field methodological approach enables us to penetrate beneath the merely descriptive (phenotypical) level of emotive behaviour and to interpret it, emotive behaviour, in dynamical (genotypical) terms. ⁽¹⁾

4) That a dynamical interpretation of the feelings,

(1) The terms phenotypical and genotypical as here used are explained in Ch. IV.

Pleasantness and Unpleasantness, may be made, revealing constancies between Pleasantness and Unpleasantness, on the one hand, and the dynamics of the field, on the other hand, that may be expressed as laws.

5) That Pleasantness and Unpleasantness are not 'elements' of feeling, but differentiations of a primary pattern of feeling hitherto undiscovered.

6) That the discovery of this primary pattern of emotive behaviour is hereby announced, the newly-discovered feeling pattern described, and given a name.

7) That in so doing, the foundation of a new dynamical theory of emotion is hereby laid.

The method employed is the field theoretical approach of K. Lewin (1935). The method used is described in Ch. IV, of this paper. It is also described more fully by J. P. Brown (1935) in his monograph Mathematical Conceptions Underlying the Theory of Psychological and Social Fields, and in his book (1936) Psychology and the Social Order.

CHAPTER II

HISTORICAL

The literature on feeling and emotion in general up to 1929 has been adequately covered by Fröbes (1929, vol. 2, pp.262-350). For an examination of several viewpoints on feeling and emotion, as presented briefly by various psychologists in the year 1928, the reader is referred to the Wittenberg Symposium (1928). On the more specific problems of Pleasantness and Unpleasantness, or hedonic tone, Beebe-Center (1932), has given an excellent account up to 1932. More recently P. T. Young (1936) has summarized the literature of action and emotion in his Motivation of Behavior. Reference is made to his Chapters 2, 5, 7 and 9. The bibliographies at the end of each chapter in Beebe-Center (1932) and Young (1936) are particularly full.

In this section a few only of the major contributions to the psychology of feeling and emotion will be mentioned. Our attention is limited chiefly to those in which the method or results have a particular bearing upon our present investigation.

Wundt's tridimensional theory of feeling dates from 1896, the publication of his Grundriss der Psychologie. In this theory Wundt maintained that there are three dimensional categories of feeling. These are pleasantness-unpleasantness, excitement-tranquilisation and tension-relaxation. In common with sensation, affection, for Wundt,

exhibited the constitutive attributes of quality and intensity. But with this difference: the qualities of sensation are limited by maximal differences, whereas affective qualities range between maximal opposites (Titchener 1908, pp 127-8). Wundt's work was done under a methodology employing atomistic-mechanistic concepts.

Titchener (1908) employing the same methodology as Wundt disagrees with his master on the number of affective elements. Titchener (1908) (1923) reduces Wundt's three dimensions to a single dimension. His single dimension ranges between the qualitative opposites of pleasantness and unpleasantness. In casting out Wundt's excitement-tranquillisation and tension-relaxation dimensions from the realm of feeling, Titchener states that "judgements of excitement are less direct [than are judgements of P and U] and the term is equivocal". "There is no evidence of a dimension of excitement-depression, still less of a number of exciting and depressing qualities" (p.166). Titchener found that "judgements of tension are easy"—a significant remark in the light of our interpretation to be made later. He describes tension in kinaesthetic terms, an interpretation which we shall attempt to criticise in Ch.VI. The careful reader of Titchener's Lectures (1908) will find that our timidity in criticising Titchener on this point is foreshadowed by Titchener himself when he states that his results are not 'conclusive' (p.166); the experiments being too few; obtained in a single

laboratory, and that a laboratory from which criticism of Wundt's doctrine had already proceeded. Most important, perhaps, is Titchener's statement "the argument upon which the experiments rest is not demonstrably valid" (p.166).

In a different tradition from the structuralistic viewpoint of Wundt and Titchener are the functional theories of feeling put forth by Piéron, Paulhan and K. Bühler. Piéron's general position is that action is essentially affective and that affect gives rise to the activity (Wittenberg Symposium, 1928, pp.284-294). This holds for action that is 'subjective' such as thought, as well as for the overt actions of the organism.

Paulhan (1930) maintains a more limited concept of the affectivity of action. According to Paulhan, whose 'conflict theory' of feeling is developed more by contemplation than by laboratory experiment, it is not the action itself but the arrest of tendency that is affective. K. Bühler (1924) and again (1928, pp 195-99) holds to a theory of 'function-pleasure' derived largely from observations of children's play. Bühler makes no attempt to discriminate between goals but holds as does Piéron that activity itself is pleasurable.

Koffka (1925) criticises Bühler in these works: "Bühler contributes a new suggestion by pointing to the fact that, aside from any consequences whatsoever, all activity brings pleasure. I would modify this statement by adding that successful activity— that is, an activity which brings

something I desire, or one that achieves what it should - brings me pleasure, whether the end attained be itself pleasureable or not. We have already met with examples of this fact; I may recall, for instance Köhler's experiment with the double-stick which Sultan fitted together, and continued to employ even after he had brought all the fruit within reach. Bühler regards this 'functional-pleasure' as the motor which drives a disinterested activity of play. I find here a very suggestive idea, but one which has yet to be developed into a theory" (p.355).

It was the above remark by Koffka that suggested the problem under investigation.

McDougall's instinct-emotion theory (1923) (1926) (1933) is a functional theory in which the concept of instinct appears to be making a last stand in the face of newer dynamic concepts. McDougall's change of the term from instinct to propensity is a verbal yielding to his critics without an essential change of the concept. Pertinent to our investigation is McDougall's statements concerning the relation of pleasure and displeasure. (1933, pp.138-142. He states the following as laws:

(1) "Pleasant feeling reinforces, sustains, supports the striving process which gives rise to it."

(2) "Unpleasant feeling checks and weakens striving."

(3) "The pleasant feeling of approach to the end of the task seems to be the only assignable ground of this spurt, of this augmented output of energy." (pp.138-140)

The above relations of feeling to action are examined in our experiments. McDougall's position will be criticized in the light of our findings in Ch. VI.

Stratton (1928, Wittenberg Symposium pp. 215-221) presented a novel exposition of excitement as an undifferentiated emotion. His stressing of the importance of the undifferentiated character of the feeling which he terms 'excitement' is considered significant in the light of our investigation. Stratton's theory will be examined in our Ch. VI.

10
CHAPTER III
CRITERIA

No basic distinction can be made between feeling and emotion. We hold with Titchener "That the majority in this case is right, and that feeling and emotion are species of the same mental genus" (Titchener 1923, p.473). The term emotive behaviour (Wheeler 1929) comprises both feeling and emotion, and is adopted in this text.

If, as Titchener points out, (1908 p 36) "the heart of the problem [of emotion] lies in feeling" it should be an interesting and perhaps not unprofitable task to attack the problem of feeling in some of its more fundamental aspects. And if we are to hope to bring any order into the chaotic state of the psychology of emotion two objectives must be kept clearly in mind: (1) to use the same criteria that have been employed by other investigators; (2) to employ a methodology more inclusive of the various factors and more precise mathematically than that used by previous investigators.

Definitions of emotive behaviour are not altogether satisfactory. But the essentials are contained in this definition by Titchener (1923) "An emotion is thus a temporal process, a course of consciousness, and it is also, characteristically, a suddenly initiated consciousness; it begins abruptly, and dies down gradually. It is a highly complex consciousness, since its stimulus is not an object, a perceptive stimulus, but some total situation or predicament. It

is through and through an affective consciousness, since both the situation itself and the organic sensations of the emotive reaction are definitely pleasant or unpleasant. It is an insistent organic consciousness, although the proportion of organic to ideational constituents varies greatly from emotion to emotion and from individual to individual. And, finally, it is always a predetermined consciousness, proceeding in the given case to a natural terminus; although here, too, there is great variability, since the determining tendencies to which the situation appeals may be almost wholly instinctive, or may be partly instinctive and partly acquired."

We limit ourselves to the accepted psychological criteria of feeling and omit physiological criteria on the ground that the latter have been found inconclusive and unreliable in the work of Landis (Carney Landis 1924, p.497) Brunswik (1924 p.286), Küppers (1919 quoted by Lindworsky, 1921, n.p. 189) Landis and Gullette (1925-p. 243), M. Sherman (1927).

What are the specific psychological criteria of feeling as distinguished, for example, from those of sensation? The criteria adopted for this study are three. From Titchener, (1908) we take the criterion of (1) the lack of the attribute of clearness -- of never coming clear in the focus of attention and (2) the criterion of qualitative opposition, 'movement between opposites' (p.289). From Carney Landis whose significant work on the emotions is worthy of the utmost

consideration, both from the physiological and the psychological points of view is taken our third criterion. This final criterion is (3) the relational criterion of emotive behaviour. It relates the psychological experience to the situation and to the energies of the situation involved; "for an emotion, says Landis "to be an emotion must be part of an entire integrated situation". (Carney Landis, 1935 p. 398). With the adoption of such established criteria, we start on common ground on that point with our predecessors. Should our results differ from those of our predecessors, using the same criteria, it is possible that one or both of us may be wrong. But it cannot be said that we are not dealing with the same things.

CHAPTER IV
METHODOLOGICAL

The purpose in this section is to define our terms and outline a method so that we may do what Lewin emphasizes must be done in every psychological investigation, viz., "inquire of every psychical event whence the causal energies come." (K. Lewin, 1935, pp.45-46).

In the present investigation of the relation of feeling to the activity of the organism as a whole, we attempt to attack critically, and to a limited extent experimentally, a problem that has been the subject of considerable speculation but of little experimentation. The reason for the relatively slight amount of experimentation to date is due we believe to the lack of adequate method. Such a method it is believed is now at our command, and is adopted for this study.

We hold with Janet (1928) that action is an essential psychological fact; and with Piéron (1928) Buhler (1928) and Marston (1928) that activity is itself affective. In order to describe in dynamical terms how action is affective and which precedes which, the action, or the effect, we will briefly outline our method and define our terms. The methodology adopted is the field theoretical approach employing the mathematical method of K. Lewin. For a more complete description the reader is referred to Lewin (1935) and J. F. Brown (1929) (1935) (1936). As necessary parts of the method, certain concepts from field theory, topology, methodology and dynamics are employed. The relatively few such terms

used in the present study will now be defined.

It must be recalled that every activity is a result-ant of forces whether, in dynamics (Clifford 1887, vol.2 pp45-49) or in psychology Lewin (1935). The close relation between dynamics and psychological behaviour is implied by the mathematical physicist A. G. Webster, (1925) ^{who derives} _{our} fundamental notions of dynamics from a psychological source the muscle sense (pp.24-25).

THE FIELD THEORETICAL METHOD

Under the field theoretical approach psychological activities are conceived as energy systems having a goal. The system as a whole is a unit. The parts of such an energy system cannot be considered as isolated units bound together by associations or bonds. The notion of bonds or associations is foreign to a dynamic psychology and fruitless in giving an adequate description of an activity or of causal relations. "For connections are never causes of events, wherever and in whatever form they may occur." (Lewin, 1935, p.48). To describe psychical activity as associated units the older method of statistics with induction is used and yields generally a central tendency only. To describe psychical activity as unified field forces, the hypothetico-deductive method and the language of constructs are employed (J. F. Brown 1935) Lewin (1935). In the former, or statistical, method mathematics is used only at the conclusion of experimentation to measure, gather up and correlate data. Under the field theoretical approach

wherein the hypothetico-deductive method and the language of constructs are employed mathematics is used not only at the end of experimentation in the measurement of data, but also before experimentation for the purpose of constructing logically related concepts and the formulating of theory. (J. F. Brown 1934). The use of mathematics in theory building and throughout the investigation has the following advantages over the older inductive-statistical method: (1) It holds that probability is thereby greatly increased; (2) Provides us with a means of measuring dynamic processes as a whole; (3) Leads to possibility of establishing a strict dynamical causality between events; (4) Is more adequate in aiding the comprehension of psychological processes involved in a dynamic activity; (5) Events in a psychological process may be ordered to locations in space, (6) Forces may be described both as to (a) magnitude (b) direction as well as (c) location.

TOPOLOGY AND ITS APPLICATION TO PSYCHOLOGY.

Topology is that branch of geometry which investigates the non-metrical aspects of space. It is the basic science of space, and topological concepts must be considered not as figures of speech but as mathematics. Topology treats of "the relationship of connection and position, properties of a qualitative nature"----"Since relational thinking tends

*Titchener pointed out the need to describe feeling in spatial terms, but lacked this method. (1926, p.251, ff.)

to structure itself in terms of spatial relationships, topology gives us the mathematics necessary to set up theories about psychological and sociological problems, where ^{fundamental} measurement is impossible at the present time.

(J. F. Brown, 1936, p.7-9). Hodological concepts treat of the path of dynamical processes.

DYNAMICAL APPLICATIONS OF MATHEMATICS TO PSYCHOLOGICAL DATA.

We pass from the mathematics of location (topology) and of paths of processes in space (hodology) to the dynamics of processes. In approaching dynamics "the science of systems undergoing change" it is desirable to consider statics and the subject matter of mathematics in general. "Statics investigates systems in equilibrium (Brown 1936)" "In mathematics we have to consider two sorts of quantities, those which do not involve the idea of direction, called by Hamilton scalars---- and those which do, called vectors". (A. G. Webster, 1925, p.4.) Forces are therefore described by Vectors.

Since the development of dynamics in the 17th Century it is difficult to question the 'reality' of the force of gravity or of magnetism. Such acceptance has been the result, no doubt, of the exactitude with which physicists have been able to predict effects upon the basis of such postulates. The 'reality' of psychological forces need be no more questionable since it is obvious that problems of dynamics are involved in all psychological behaviour. The differences

in predictability between events in the physical field and events in the psychological field are due to differences in exactitude of measurement and not to error in the assumption of the 'legality' of dynamics in both fields.

We are now ready to define the non-metricised dynamical concepts applicable to psychology and employed in our investigation of action and feeling. These concepts are considered scientifically valid for the reasons heretofore stated, and for the additional reasons that they are (1) amenable to the logic of dynamics, (2) operationally definable, (3) intersubjective, i.e., understandable from one mind to another, and (4) give rise to theories which may be subjected to critical experiment.

PSYCHOLOGICAL FIELD.

The total activity of a dynamical psychological process and the various forces involved therein are known as the psychologic field. "The psychological field is a mathematical spatial construct to which all psychological behaviour may be ordered". (Brown, 1935, p.14) Every kind of psychological data such as the data of perception, of learning, of emotion, takes place within the field and may be ordered event by event to the dynamics of the field. The individual Observer 'O', taking part in our experiment is considered to be in the field. His various activities with reference to the goal are the resultants of the various forces and counter forces which, like himself, are within the field.

Certain topological concepts applicable to the psychological field will now be described:

(1) The individual Person is a relatively segregated part of the field; in our experiments, the Observer.

(2) Point-region. In the mathematics of the field, the Person is designated as a point-region. Point-regions are those segments of space which are treated mathematically as points, i.e., as mere places of location, without dimension. Our Observer is, in this way, given definite positions from time to time within successive regions of the field.

(3) Region. A region is any segment of space by which location may be designated within the field. A point, a line, a plane, and a solid are regions of, respectively, 0, 1, 2, and 3 dimensions, and on to N dimensions as a limiting case. Regions are characterized as bounded and unbounded, limited and unlimited, as will be described later under locomotion.

(4) Locomotion. Locomotion is the psychological activity of any sort that may be ordered to a path within the psychological field. Locomotion is limited if the point-region continues locomotion in a given direction indefinitely without returning to its initial position. It is, therefore, by means of locomotion that we are able to define bounded and unbounded regions. For example, a bounded region is one "in which locomotion of a point-region in a given direction must eventually bring it incident to another region, (the boundary).... If the point-region does not eventually become incident to another region, the region

is said to be unbounded".(J.F. Brown, 1938,p.16)

(8) Boundary. A boundary is any limitation to locomotion. It is a form of barrier marking off a region. A barrier may be impenetrable, but is not necessarily so. If a boundary is penetrated, psychological changes take place in the person, for it is important to keep in mind that in crossing a boundary the person is thereby ordered to a new social or psychological region and his personal characteristics are correspondingly changed.

CONCEPTS DESCRIPTIVE OF BEHAVIOUR.

Certain non-metricised concepts are also applicable as aids in the description of behaviour, such as action and emotion, in the psychological field.

(1) Barrier. Topologically, a barrier is the same as a boundary (cf. 8 above) in that both a boundary and a barrier limit locomotions within a region. Psychologically, however, boundary and barrier differ. A barrier is a limitation on the degree of freedom within the field.

(2) Medium. Conceiving of the person as a thing located at a point-region, and of the person's activity as locomotion, the medium is conceived as the psychological space through which the locomotion takes place. In physics, a body falling in the gravitational field falls through the medium of atmosphere. Likewise, in the electro-static field activity takes place through a medium. In the same way, the psychological medium through which locomotion takes place has definable dynamic properties. These properties, being dynamic, are subject to dynamic variations as the

* This definition is illustrative, not stringently mathematical.

locomotion proceeds.

The various properties of the medium will now be briefly defined operationally, i.e., they will be defined in terms of what they do, and will be given experimental or statistical indices to indicate degrees of variation. (a) Fluidity. The fluidity of a medium is said to vary with the ease of locomotion in the medium in the absence of barriers and internal obstructive factors. Ease of locomotion through the medium takes place in a field of high fluidity. Contrariwise, in the absence of barriers and internal resistances to action, the medium may be said to have low fluidity when locomotion through the medium is difficult. In terms of energy used, it may be said that with high fluidity, locomotion is accomplished by relatively less energy than is necessary in a medium of low fluidity. This is apparent when we observe two different psychological fields having distinctly different degrees of fluidity. For example, a student day dreaming about home and loved ones accomplishes his mental activity with considerable less energy than when he is applying his thought to a difficult problem in trigonometry. In terms of fluidity, the medium in the first case may be said to possess a much higher degree of fluidity than does the second. (b) Permeability. Permeability refers to locomotion through a barrier. The degree of permeability of a barrier is determined by the ease with which locomotion is accomplished through the barrier. Thus, a barrier of high

permeability permits locomotion through it with comparative ease, whereas a barrier of low permeability permits locomotion through it with more difficulty.

(3) Degree of freedom of locomotion. By this is meant the number of possibilities in which the locomotion may take place. In a rifle barrel there is one degree of freedom. The ball can be discharged in one and only one way. In the psychological field, degrees of freedom of locomotion range from one degree to N degrees. In a field of low fluidity there are few possibilities of locomotion, i.e., there are fewer degrees of freedom than in a field of high degree of fluidity. It is considered that in the highest degree of fluidity, there are N degrees of freedom of locomotion. Blockage in any field with any degree of fluidity limits the degree of freedom of locomotion.

(4) Force. Lewin defines a force by its three properties: (a) direction, (b) strength, (c) point of application. "Dynamically the force is correlated with psychobiological locomotions in a one-to-one correspondence. 'The real locomotion must occur in every case according to the direction and the strength of the resultant of the momentary forces' and 'In any case of locomotion there exists a resultant of forces in its direction.'" (Lewin 1936, p.81).

(5) Vector. A vector is the mathematical representation of a force having direction and strength. Its mathematical symbol is an arrow. The vector is so used in the descrip-

tions of our present investigation, thus \longrightarrow . It is necessary to distinguish between driving forces represented by the vector and restraining forces which correspond to vectors and are represented thus  .

(6) Tension. Tension is the dynamic basis for the arousal of vectors. Tensions are thus potentials of the kinetic activities described by vectors. "Tension is defined as the opposition of field forces." (Lewin, Op. Cit., p.94). Tensions in the field may be few or many. They may vary in intensity. They may be described in terms of greater or less intensity, but the mathematical property of direction is not ascribed to them. In this respect, tensions and vectors differ. Magnitudes may be described as tensions up to the point where they are resolved into a definite direction. When the property of direction may be ascribed to a magnitude, it is then known as a vector.

With our method outlined and terms defined, it will be our task to investigate the feelings experienced by the individual Person while performing various activities within the field and subject to the dynamics of the field. A clear distinction must be kept throughout between (a) the dynamical processes and (b) the experiential ~~phenomena~~, such as feelings. We will then be in a position after each experimental observation to inquire "whence the causal energies come" (Lewin, 1925 p.46.). Special attention will be given to spatial and temporal relationships between the two in making our observations.

Summing up our account of the field theoretical approach, it is believed to be a method entirely adequate to satisfy five requirements that a theory of feeling must satisfy. Harlow and Stagner, with whom I am in agreement (1931, pp. 570, 572, 582, 589) state four requirements: (1) The requirement of observed behaviour. (2) The requirement of introspection of feelings experienced. (3) The requirement of psychopathology, i.e., explanation of both normal and abnormal genotypical concepts. (4) The requirement of physiology i.e., not running contrary to the established theories of physiological processes.

In addition to the four requirements stated above, the field theoretical approach meets also, (5) the requirements of field dynamics.

* By genotypical is meant pertaining to underlying causes, in contrast to phenotypical meaning limited to surface description. Cf. Lewin (1931a; pp.141-177)

CHAPTER V

THEORETICAL AND EXPERIMENTAL

The psychologist may learn much from the physicist in the matter of scientific theory. A distinguished physicist, J. J. Thompson (1907), speaking of the rôle of theory in method points out that a theory is a policy rather than a creed. "Its object is to connect or coordinate apparently diverse phenomena, and above all to suggest, stimulate, and to direct experiment."(p.1)

A careful perusal of the field methodological approach and the hypothetico-deductive method will, it is believed, show nothing inconsistent with the methodological approach employed in Köhler's Physischen Gestalten (1920) nor inconsistent with the position of the distinguished contemporary physicist, P. W. Bridgman, in his Logic of Modern Physics (1927).

But it must not be inferred that our methodological approach has been taken from physics alone, for it has proved itself servicable in various scientific disciplines. We shall attempt to give evidence of the fruitful use of the field theoretical approach in various other branches of science. Let us cite examples of its application to biology.

D'Arcy Thompson (1917) has brought out numerous examples showing the influences of environmental forces in shaping the morphology of organisms. Coghill (1929) has presented a most convincing interpretation, from the

organismic viewpoint, of both the anatomy and behaviour of the organism based on careful observations of the anatomy and behaviour of Amblystoma. Coghill supports his interpretation with ample data to show that both anatomical patterns and the behavioural patterns of the organism proceed along organismic lines. Employing the methodological approach outlined above he makes it clear (1) that "the behaviour pattern develops in a regular order of sequence of movements which is consistent with the order of development of the nervous system and its parts," and (2) that "in a relatively precise manner physiological processes follow the order of their embryological development in the functions of aquatic and terrestrial locomotion and feeding." (p.36). Coghill further shows that "there are two processes that are operating simultaneously in the development of behaviour. The one is expansion of the total pattern as a perfectly integrated unit; the other, individuation of partial systems which eventually acquire more or less discreteness." (p.88).

At the psychological level, Wheeler and Perkins (1932); Gengerelli (1934); Lashley (1924); J. Peterson (1916 and 1927); and Koffka (1925) have produced striking data in support of these principles when applied to the learning process. The adequacy of this method in the interpretation of the phenomena of perception is evidenced in the work of Wertheimer (1912); Köhler (1929);

Koffka (1935); J. F. Brown (1931, pp. 199-232). In problems of emotion this methodological approach has demonstrated its value in the work of K. Lewin where it has been strikingly fruitful both in the development of the methodological technique and of dynamic concepts for the interpretation of data (Lewin, 1935). In the relatively few cases where the method of Lewin has been used in the investigation of problems of action and emotive behaviour (Lewin, 1935; Karsten, 1928; Dembo, 1931) sufficient evidence is shown of the soundness of the method in the formulation of theory and in fruitfulness of results.

The preceding data revealing organizations and constancies in the patterns of behaviour at the physical, physiological and psychological levels are adequately explained in the terms of field dynamics. The question now faces us: Are dynamical concepts adequate to explain the relation of the feelings of the organism ~~in relation~~ to the dynamics of the environment? We shall proceed to give briefly a field dynamical interpretation of the organism and the environment in operationally definable terms.

THE ORGANISM AND THE ENVIRONMENT

Under the field theory the environment-organism relation is conceived as a system of forces, the total field being a total system of which the organism is a subsystem, and it would be quite erroneous under this logic to

conceive of the organism as an entity apart from its environment.

The primacy of the field, or total system over the organism, or subsystem, and the above relationship between organism and environment may be made clear by a single illustrative example. (White, 1931, pp. 46, 65) gives an interesting example of the human organism in relation to its environment from the viewpoint of field theory. "The close correlation of the reciprocal aspects of the organism and the environment seems incapable of having any other meaning so that, to repeat the words of Henderson, 'A fit organism inhabits a fit environment'.....This dictum indicates that organism and environment are verbal distinctions, that the problem which these two terms usually indicate is what I call a pseudo-problem, quite in the same way as the body-mind, functional-organic problems. Organism and environment are only different aspects of this reciprocal relation and the same laws govern in both realms throughout, a conclusion which runs parallel to similar developments in the realm of physics.....What constitutes an individual is a matter of definition, and whatever for the particular object in view we may consider an individual, then it follows of necessity that all the rest of the cosmos for that individual is a part of his environment. It will be seen that from the standpoint of the relation of the individual to the environment as already

indicated there is no separateness, that we may, as a matter of fact, consider the individual as a portion of the environment, a split-off portion of the environment as it were, which split-off portion continues to receive energy from the environment as long as it exists as an organism and to give up energy to the environment in return. The organism, in other words, is a transformer of energy. From the psychological point of view it is very significant to think of the organism as having taken into itself aspects of the environment which it builds up to suit its purposes. Food, at one end of the list, is taken in and turned into tissues. Ideas, at the other end of the list, are assimilated from the human agencies in the environment and become standards of conduct. In this way we see the individual organism slowly becoming more and more specialized, more and more individualized, to use the language that we have been using up to this point, individualized in its development from the environmental forces, and to the onlooker this whole process appears to be constant movement in the direction of a more complete separation of the individual from the surrounding forces of the environment." (White, 1931, p. 65).

This implies that feeling and emotional responses derive from the environment as well as from the organism, i. e., are both environmental and attitudinal on the part of the organism, (Cf. Gottschaldt, 1926; 1929),—an implication to be tested in our experiments.

A second implication of this theoretical position is that action is determined by the dynamics of the environment-organism continuum, or field. Recalling that there are two fields, the geographical field and the behavioural field, in which action is so determined, what is the difference in the actions taking place in the two fields? In the geographical field, action is transportative of substances; in the behavioural field, action is excitatory. The importance of this distinction is made clear by C. M. Child. "The dynamic or excitatory relations are, however, fundamentally non-specific or quantitative, involving energy transfer as the primary factor rather than mass exchange of substances. This difference is of fundamental significance for the conceptions of the individual organism as a physiological order and integration." (C.M. Child, 1924,p.17). The same we believe, applies to behaviour at the psychological level in the behavioural field. The energy transfers taking place at the physiological level and at the psychological level are subject to description and measurement in topological and dynamical terms. (Ch. IV).

When we ask how this is to be done our answer is: by the study of the organizations involved. "By studying organization, therefore, we may be able to discover what particular kind of dynamical events is responsible for sensory order". (Köhler,1929, p.182).

So, also, we may infer that by studying organization we may be able to discover what particular kind of

dynamical events is responsible for feeling and emotional order. (Cf. Köhler, 1929, p.193), who states "the concept of gestalt may be applied far beyond the limits of sensory fields. According to the most general definition of gestalt, the processes of learning, of reproduction, of striving, of emotional attitude, of thinking, acting, and so forth, may be included as subject matter of gestalt-theorie insofar as they do not consist of independent elements, but are determined in a situation as a whole".

The Gestalt-theoretical view point here outlined involves also the principle of isomorphism which we adopt in our theoretical position. Köhler states the principle of isomorphism as follows: "Any actual consciousness is in every case not only blindly coupled with its corresponding psycho-physical processes, but also akin to it in essential structural properties." (Köhler, 1920, p.193).

With this theoretical position established, it is not unreasonable to suppose that similar patterns of dynamic forces are common to the psycho-physical processes and to the consciousness of feelings. Our experimental attack upon the problem of feeling and action will be designed to observe the dynamic constancies, if any, which obtain in these two realms.

With our theoretical position stated as above, it is believed to be superior to the atomistic-mechanistic approach to the problem. (1) It is logically consistent. (2) It is supported by previous experimental evidence.

(3) It provides greater precision in its mathematical description and measurement. (4) In a practical sense the field approach is superior because it starts with the measurement of environmental factors which are more amenable to manipulation and measurement than are the factors of the organism alone. (5) The experimental findings of M. Sherman (1927) and of Landis (1924) point to the fact that only by a knowledge of the environmental situation can feelings or emotive behaviour be accurately described. (Young, 1936, pp 456-457).

PART 1

(A) THE HYPOTHESIS

Accordingly, our hypothesis is, that at the psychological level a consistent dynamical relation exists between the goal activity of the Person in the field and the Person's specific forms of emotive behaviour designated as Pleasantness (P) and Unpleasantness (U).^{*} Expressed in mathematical terms, our hypothesis is that feeling is a function of action. We resort to experimentation to test the hypothesis. And experimentation should either confirm or invalidate this hypothesis.

(B) EXPERIMENTAL METHOD

A peg board game presenting considerable difficulty in its solution was used in the experiments. The game consists of 32 removable pegs fitting easily into an orderly arrangement of holes in a circular board $6 \frac{3}{8}$ inches in diameter.

* In using P for Pleasantness and U for Unpleasantness we conform to current usage. But P here is not to be confused with Lewin's P for Person which in this text is spelled out.

FIGURE 1.

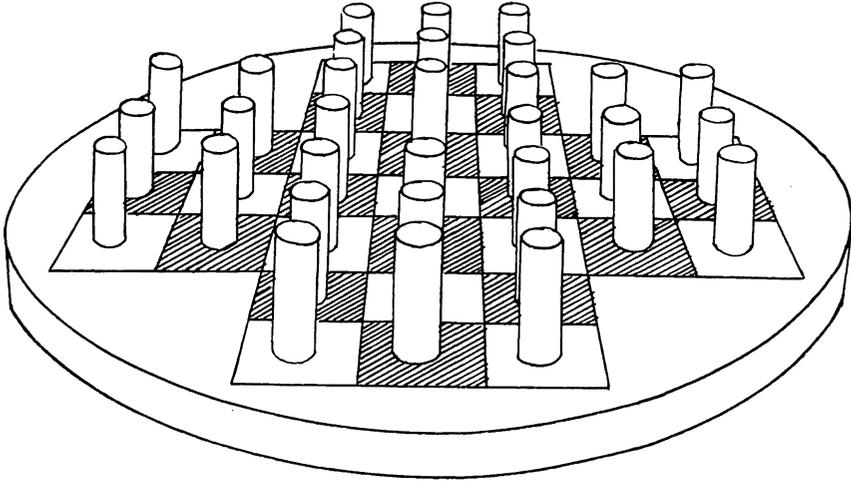
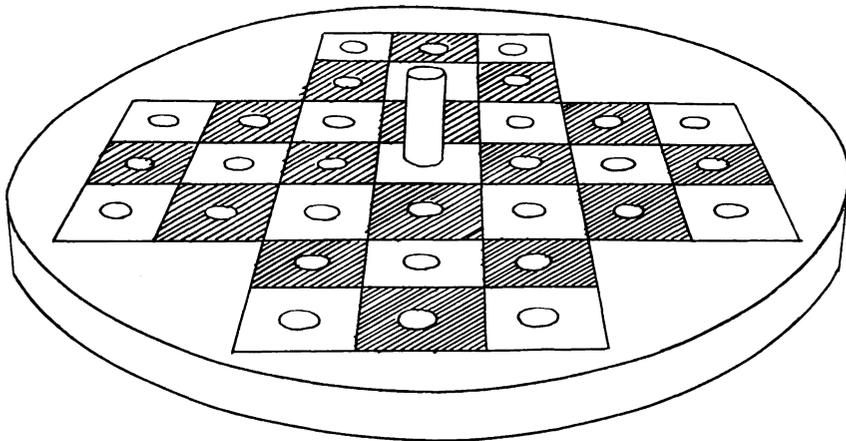


Diagram showing peg board and pegs before game activity starts. Central hole vacant - all other holes filled with pegs.

FIGURE 2.



The peg board at successful conclusion of the game. Center hole occupied by peg - all other holes vacant.

In the board are 33 holes, one more hole than there are pegs to fill them. At the start of play the central hole is vacant. To play the game the Observer moves one peg at a time, jumping an adjacent peg, and placing the peg moved into a waiting hole. The 'jumped' peg is removed from the board. Pegs are removable from board only by jumping. The objective is to remove all pegs but one, and that one peg is to be located in the center-most hole. (See fig. 1 and fig. 2).

We have in the peg board game materials that provide a goal activity. The Observer playing the game encounters sufficient difficulties in his efforts at solving it to arouse feelings of Pleasantness (P) and Unpleasantness (U), and other feelings including mild anger. Care was taken to avoid an experimental situation with difficulties so extreme as to arouse pronounced anger or hate. The dynamics of anger had been previously investigated by Dembo (1931, pp.1-144). Our desire was not to repeat the able investigation of Dembo, but to limit our observations to the feelings of Pleasantness (P), Unpleasantness (U) and other milder forms of emotive behaviour. As an additional aid in this purpose our experiments were carried out in a quiet room where noises, sudden strains, interruptions and fear-producing shocks were obviated. Twenty-one subjects, one at a time, in the presence of the Experimenter, took part in the experiments. The subjects, of course, had no knowledge of the problem under investigation. The experiments, in this section, Part 1, were carried out

over a period of three years, 1932-35. In Part 2, described later, nine subjects served as Observers, and one additional year, 1935-36, was devoted to experimentation.

Instructions. The 'O' was instructed to remain quiet until relaxed and comparatively free from feelings of any kind; then to proceed with the activities of the peg board game. He was told to introspect his feelings, of P, U, and any other feelings experienced along with the various activities of the game. The introspections were recorded when given.

The Experimenter, on his part, observed the activities of the 'O' with reference to his progress in the game, and also noted 'objective' aspects of the 'O's emotive behaviour as a supplementary check on the 'O's introspections of his feelings.

A graph, (see Fig. 3) was used on which were charted the actions and the feelings. Within this form two dimensions were plotted (1) the longitudinal dimension, representing the progress of the activity toward the goal (G); and (2) a vertical dimension to represent the degrees of P and of U, experienced while the action took place. Three 'subjective' degrees of P and U were introspected by each Observer. These were P_1 , P_2 , P_3 , and U_1 , U_2 , U_3 , ranging from an arbitrary neutral zone running left to right, through the center of the elliptical form. (See Fig. 4. Graph of Feeling).

It should be borne in mind that both vertical and longitudinal dimensions in this form refer to the behavioural field.

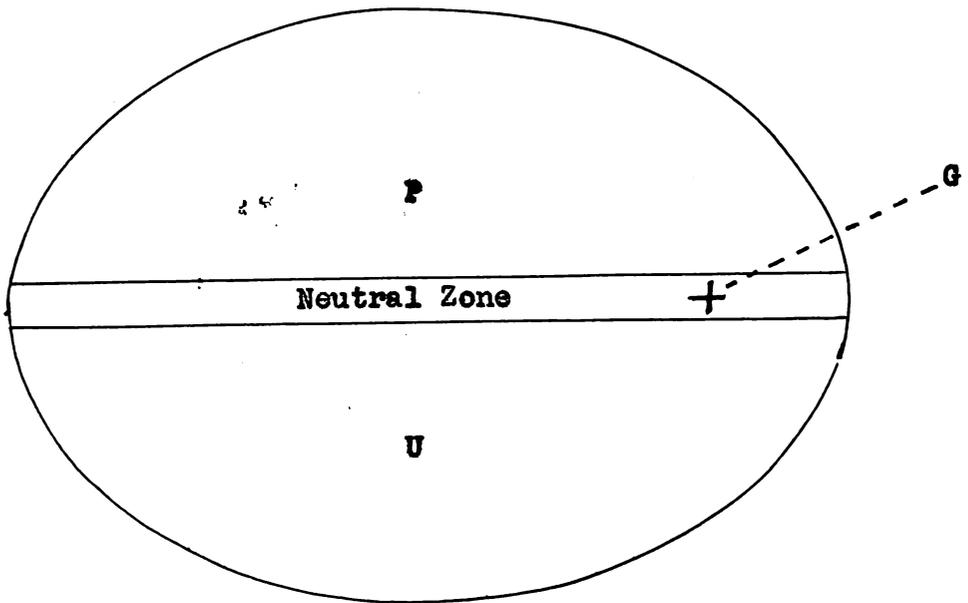


FIGURE 3

Showing the total situation representing the goal activity. (Graph of action).

In the vertical dimension are represented the feelings. (Graph of feeling).

Pleasantness (P) is indicated above the central 'neutral zone'. Unpleasantness (U) is represented in the space below the 'neutral zone'.

The action is represented by the longitudinal line beginning at left and extending toward goal (G) at right.

The three spaces at the top of page are an enlargement of the neutral zone through the center of the graph. The neutral feeling (Feeling X) is represented thereon.

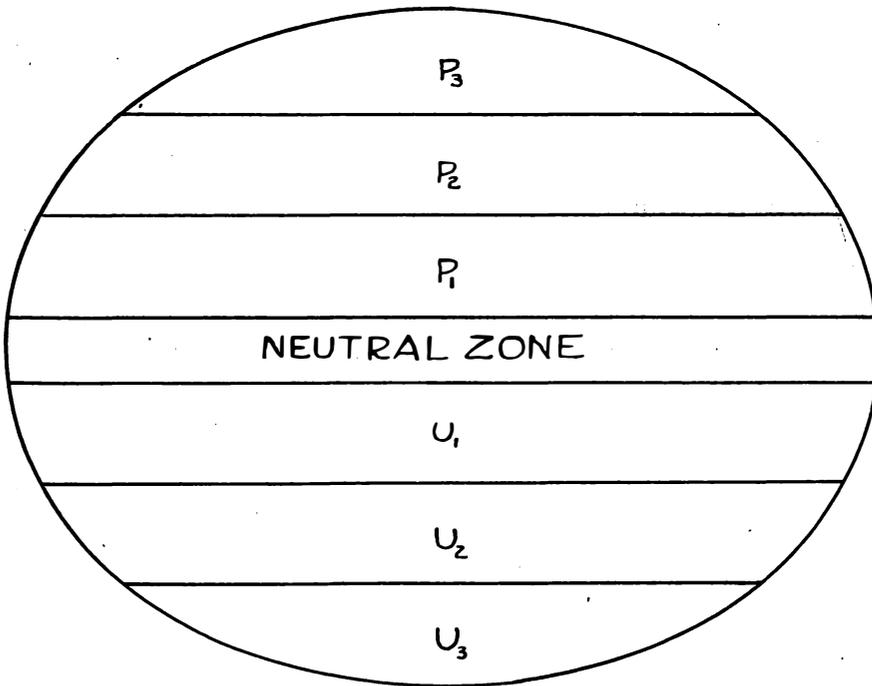


Fig. 4
Graph of Feeling.

Showing feeling zones in relation to each other.
Neutral zone = zone devoid of P and U but not
devoid of all feeling.

P_1 = mild Pleasantness; P_2 = medium Pleasantness
 P_3 = extreme Pleasantness.

U_1 = mild Unpleasantness; U_2 = medium Unpleasantness;
 U_3 = extreme Unpleasantness.

GENERAL PLAN OF EXPERIMENTATION

We had, as previously stated, twenty-one Observers. Of this number, nine were trained in psychology, being members of the teaching staff or graduate students of psychology in The University of Kansas. The remaining twelve were more or less psychologically naïve. This second group served as a control group to check on possible errors due to presuppositions or adherence to any particular systematic position on the part of members of the trained group. All were adults over twenty and under fifty years of age. None knew of the hypothesis to be tested. This precaution proved to be unnecessary. The introspections of the two groups were fundamentally the same. The trained group, however, reported their observations in more minute detail.

The purpose of the investigation was to conduct experiments on the feelings and the goal activities of the Person as a whole. Correlations of feeling and action were made after observations under three major headings:

(1) Temporal relations, (2) Quality, and (3) Intensity.

(1) The temporal relation of feeling and action.

(A) Temporal relation of Pleasantness (P)
to Action.

(B) Temporal relation of Unpleasantness (U)
to Action.

(2) The quality of feeling experienced with action.

(A) Quality of feeling experienced with 'free',

i.e., unimpeded action.

(B) Quality of feeling experienced with blocked activity.

(3) The intensity of feeling experienced with changes in the intensity of action.

(A) Effect of increasing intensity of action.

(B) Effect of decreasing intensity of action.

Each Observer carried out the experiment under one set of conditions in which the energy expended was of comparatively low intensity. Introspections as to feelings experienced were recorded by the Experimenter, and verified by the Observer at the end of each game, regardless of whether that game was blocked or completed.

(1) EXPERIMENTS ON THE TEMPORAL RELATION OF FEELING TO ACTION

(A) THE TEMPORAL RELATION OF THE FEELING (P) TO ACTION.

With the foregoing general descriptions of the total field, the methods of ordering (1) actions, and (2) the feelings to the field, we will now take an illustrative case and state specifically what was done.

In the following experiment our purpose is to observe feelings and actions in their temporal relationship. Our efforts will be directed toward determining which, whether action or feeling, comes first, and which follows. The method used will be introspections by the 'O' and observation of 'O's' behaviour by the Experimenter.

Observer. The Observer is seated relaxed at the table. On the table before him within easy reach of his hands is the peg board game which, for our purpose, serves as stimuli.

Instructions. The 'O' is instructed as follows: You are to play this peg board game, jumping one peg at a time and removing the jumped peg, according to previous general instructions, until but one peg remains, and that peg is to be inserted on the last move into the central vacant hole.

While you are performing the required actions the Experimenter will record on a chart each jump you make. You, the Observer, are to introspect on the feelings of Pleasantness you experience, giving especial attention to the temporal relation of feeling P with reference

to your action at the time the feeling is experienced. By action is meant the 'mental' processes involved in solving each step of the problem, not the overt action of the hand. You are to limit your introspections to feelings of Pleasantness (P) alone in this first experiment and report whether P follows or precedes your action. Ready? Begin.

Procedure. The 'E' then proceeded to record on the longitudinal dimension of the graph the progress of 'O's' activities. Each jump of a peg was represented by one spatial unit of the 31 units required to reach the goal. The 'E' also recorded the 'O's' introspections as to whether P followed action or preceded action. Results of observations on the temporal relation of feeling P to action are shown in Chart A.

It is evident from the foregoing results that our 'O's' observed feelings of P to follow action. Our records show that out of twenty-one Observers, three 'O's' were unable to make positive discriminations. Consequently, these are recorded by a (?). Three uncertain observations fall on the side of Feeling P preceding action and two fall on the side of Feeling P following action. The 'O's' who were unable to make positive discriminations were untrained in psychological experimentation, as were also nine other 'O's' who were able to make positive discriminations.

With these reservations as noted, our results thus far are in accord with the findings of Nafe (1924) who

CHART A

SHOWING TEMPORAL RELATION OF
FEELING (P) TO ACTION

SUBJECT	ACTION	Feeling of pleasantness	
		Precedes action.	Follows action.
A	Forward to-	?	27
B	ward goal	none	63
C	"	"	21
D	"	"	19
E	"	"	11
F	"	?	?
G	"	none	18
H	"	"	13
I	"	"	14
J	"	?	?
K	"	none	8
L	"	"	22
M	"	"	12
N	"	"	118
O	"	"	39
P	"	"	176
R	"	"	70
S	"	"	35
T	"	"	30
V	"	"	61
W	"	none	14
21		5 questionable	781
%		0.63%	99.37%

CHART A

SHOWING TEMPORAL RELATION OF
FEELING (P) TO ACTION

SUBJECT	ACTION	Feeling of pleasantness	
		Precedes action.	Follows action.
A	Forward to-	?	27
B	ward goal	none	63
C	"	"	21
D	"	"	19
E	"	"	11
F	"	?	?
G	"	none	18
H	"	"	13
I	"	"	14
J	"	?	?
K	"	none	8
L	"	"	22
M	"	"	12
N	"	"	118
O	"	"	39
P	"	"	176
R	"	"	70
S	"	"	35
T	"	"	30
V	"	"	61
W	"	none	14
21		5 questionable	781
%		0.63%	99.37%

states: "Affection is palpable; it stands up under observations." (p. 543).

Our results further appear to show that the feeling of Pleasantness (P) follows action, when action is defined in 'mental' terms, in 99.37% of 781 cases, (judgements of P.)

(B) THE TEMPORAL RELATION OF THE FEELING (U) TO ACTION

In this experiment the conditions and instructions were the same as for the preceding experiment except for the following change in instructions. The 'O' was instructed: "In this experiment you are to limit your introspections to feelings of Unpleasantness (U) alone, and report whether U follows or precedes your action."

Results of observations on the temporal relation of feeling U to action are shown in Chart B.

The 'O's' feeling of Unpleasantness (U) appeared to be more vivid or poignant, hence less difficult to discriminate than was the feeling of Pleasantness (P). Of a total of twenty-one 'O's' all were able to make discriminations of U in its temporal relation to action. The 'objective' actions that accompanied the feeling of U, as those actions were noted by the 'E', were observed to be a wavering activity of the hand from side to side, a hesitant movement of the hand forward and backward, and at times a complete cessation of action.

The results of observations on the temporal relation of the feeling of U to action indicates that U followed action in 100% of 452 cases. (See Chart B which follows.)

CHART B

SHOWING TEMPORAL RELATION OF
FEELING (U) TO ACTION

SUBJECT	ACTION	Feeling of Unpleasantness	
		Precedes action	Follows action
A	hesitant	none	2
B	blocked	"	51
C	hesitant	"	7
D	"	"	8
E	"	"	1
F	"	"	1
G	"	"	2
H	"	"	5
I	blocked	"	1
J	"	"	
K	"	"	5
L	"	"	3
M	"	"	5
N	"	"	31
O	"	"	25
P	blkd & hesnt & vascillating	"	65
R	blocked	"	44
S	"	"	10
T	"	"	39
V	"	"	135
W	"	"	12
21		NONE	452
%		—	100 %

(2) EXPERIMENTS ON QUALITY OF FEELING

ON THE QUALITY OF FEELING EXPERIENCED WITH ACTION.

Our purpose in the next experiment was to observe the quality of feeling experienced by the 'O's' in relation to a definite type of action with reference to the goal.

(A) QUALITY OF FEELING EXPERIENCED WITH 'FREE' ACTION

The type of action chosen for this purpose was 'free' activity, i.e., action that makes definite progress toward the goal, action that is unimpeded by a barrier. (For definition of barrier as used in our interpretations, see Ch. IV).

The 'O's' were instructed to pay particular attention to the quality of the feelings that accompanied 'free' activity, that is to say action which makes definite progress toward the goal; action that is, or is believed to be problem-solving by the 'O's', such as insight; in brief, the quality of feeling, any feeling, accompanying action that is moving forward toward the goal.

The Experimenter, on his part, was to record on the elliptical form such actions as eventuated in the 'jumping' of pegs. He recorded as heretofore, one spatial unit for each jump of the peg. This served as an objective check upon the 'O's' introspections as to forward actions. The 'E' also recorded the introspections of the 'O's' on the quality of feeling experienced with 'free' or unimpeded action. Results are shown in Chart C.

CHART C

Showing quality of feeling experienced with free, that is unimpeded activity.

Subject	Action	Feeling		Other feelings
		P	U	
A	unimpeded	27	none	
B	"	63	"	
C	"	21	"	
D	"	19	"	
E	"	11	"	
F	"	?	?	
G	"	18	none	
H	"	13	"	
I	"	14	"	
J	"	?	?	
K	"	8	none	
L	"	22	"	
M	"	12	"	X
N	"	118	"	X
O	"	39	"	X
P	"	176	"	X
R	"	70	"	X
S	"	35	"	
T	"	30	"	X
V	"	61	"	X
W	"	14	"	X
21		781	2(?)	Yes
%		99.75%	0.25%	

It is perhaps significant that the feeling of Pleasantness (P) was experienced in connection with 'free' action, by all of the twenty-one 'O's' in 783 cases. Two doubtful cases in which discriminations could not be clearly made, were considered unpleasant and recorded under U. In terms of percentage the relation between unimpeded action and Pleasantness was then observed in 99.75% of the 783 cases. (See Chart C).

While in no case was Unpleasantness (U) experienced during an interval of 'free' or unimpeded action, other feelings than P were reported by the 'O's' as accompanying 'free' action. The feeling, or feelings, lack the distinctive qualities of both P and U. The introspections given here were: "neither pleasant nor unpleasant, but somewhat exciting", a "feeling of expectancy", "a feeling of tension". Observations concerning the feeling, or feelings, were noted in the introspections of eight of the twenty-one 'O's'. These observations were recorded here because they happened to come out at this point in our experimentation. The appearance of this feeling, or these feelings, came 'accidentally', i.e., not anticipated by any of the 'O's' or the Experimenter. This subject will be taken up and developed later. (Ch. V, Part 2).

(B) QUALITY OF FEELING EXPERIENCED WITH BLOCKED ACTION

In the next experiment on the quality of feeling experienced with action, our purpose was to observe the quality of feeling experienced by the 'O's' when their

activity was impeded or blocked by a barrier. The barrier (Ch. IV) was in this case the 'internal' barrier of the Person. That is to say the barrier was imposed not by the 'E', but came about by the lack of insight on the part of the Person to solve the various steps of the problem.

EFFECT OF 'INTERNAL' BARRIER

The 'O's' were instructed to introspect on the quality of feeling, or feelings, experienced whenever an 'internal' barrier was encountered in the progress of their activities toward the goal.

The Experimenter, as before, recorded on the elliptical form such actions as were evidenced in the jumping of pegs, using the same spatial units as in the previous experiment. Also, as in the former experiment the 'E' recorded the introspections of the 'O's' on the quality of the feeling, or feelings, experienced with impeded or blocked action. Results are shown in Chart D.

Results: Of the twenty-one 'O's', twenty reported distinct Unpleasantness (U) upon encountering a barrier that blocked activity. The one exception was Observer W, who reported that the stimulus was not strong enough to produce Unpleasantness. The value of the game was "too mild, too slight to be really unpleasant if I don't break through." The other twenty observers reported blocked activity to be unpleasant in 450 cases.

CHART D .

Showing effect of activity blocked by
'internal' barrier.

Subject	Action	Feeling		Other feelings.
		P	U	
A	hesitant	none	2	
B	blocked	"	51	
C	hesitant	"	7	
D	"	"	8	
E	"	"	1	
F	"	"	1	
G	"	"	2	
H	"	"	5	
I	blocked	"	1	
J	"	"		
K	"	"	5	
L	"	"	3	
M	"	"	5	X
N	"	"	31	X
O	"	"	25	X
P	blocked & vascillat- ing	"	65	X
R	blocked	"	44	X
S	"	"	10	
T	"	"	39	X
V	"	"	135	X
W	"	"	12	X
21		none	450	
%		—	100%	

EFFECT OF 'EXTERNAL' BARRIER

Conditions were changed to provide a more decided and sudden barrier to the activity. The 'O's' were instructed to proceed once more with the game under exactly the same instructions as before. But the 'E' varied the procedure after play had started by injecting an 'external' barrier without forewarning to the 'O's'. This was done as the 'O' was preparing to make a forward move. The 'E' commanded sharply, "No, not that move." The 'external' barrier thus imposed by the 'E' produced a feeling in the 'O's' that was invariably unpleasant. (See Chart E.) So extreme was the unpleasantness to six 'O's' taking part, that it was thought best to abandon this phase of the experiment, after from two to eight cases with each 'O', lest the extreme annoyance to the 'O's', amounting in several cases almost to disgust, would discourage them and thus wreck the possibility of their cooperation in future experiments. (This extremely annoying phase became known in the laboratory as the "Oh hell" stage of the experiments, in contrast to the previous "Ah ha" stage when the approach to the goal was interesting, exciting and pleasurable.) Results show unpleasantness (U) to result from blockage by 'external' barrier in 100% of the 25 cases.

The introspections of the 'O's' reveal that they were experiencing Pleasantness (P) when their actions were going forward, but when the 'external' barrier was suddenly placed in the way of their progress toward the goal, the

CHART E

Showing effect of blocked activity when external barrier is imposed by the 'E' upon the 'O's'

Observer	Barrier	Feeling		Cases
		P	U	
B	External	none	8	8
T	"	"	2	2
P	"	"	5	5
V	"	"	5	5
R	"	"	3	3
O	"	"	2	2
6		none	25	25
%		—	100%	

feeling changed abruptly from P to U. A comparison of the degrees of P and U during these changes is noteworthy. When Observer was experiencing mild Pleasantness (P) the change was to the same degree of Unpleasantness (U₁). Similarly, P₂ changed to U₂, and extreme Pleasantness (P₃) changed to extreme Unpleasantness (U₃). It would appear from these observations, as well as from Experiment 2-B, that a blocked activity is productive of Unpleasantness (U), and in approximately the same degree. It is apparent, also, that the 'internal' barrier, i.e., lack of insight on the part of the 'O' is a real barrier. This is demonstrated by the fact that it is productive of the same quality of feeling that is produced by the 'external' real barrier imposed upon the 'O' by the 'E'. The above experiment, therefore, in which the 'E' suddenly blocked the activities of the 'O' by his command, "No, not that move", serves as a check on our assumption of the reality of the 'internal' barrier and appears to prove its reality under controlled conditions.

Moreover, the above experiment appears to show that the quality of a feeling can be changed from P to U under controlled conditions. The change of feeling from U to P was observed previously to result when a barrier was permeated and locomotion toward the goal resumed. (Experiment 2-A).

Results: Six 'O's' took part in this experiment. The number of cases was fewer than planned due to the fact, as

explained above, that the extreme annoyance on the part of the 'O's' threatened the continuance of their co-operation in the experiments. In explanation of the relatively few cases due to the above reasons, it should be said that the 'external' barrier in every case came as a surprise to the 'O's'. Continued application of the 'external' barrier to any one 'O' may be expected by him and lead to habituated responses. One 'O' remarked in the course of the experiment: "That would be unpleasant to me if you did it a hundred times."

The results show a consistent trend. 100% of the total of 25 cases show $U_{\text{unpleasantness}}$ (U) experienced when activity is blocked by a barrier. But it may be considered significant also, that of these 25 cases all of them showed that the quality of the feeling was changed from P to U, and to a similar degree in each case, under controlled conditions by the imposition of the 'external' barrier in the form of a command by the 'E'.

EFFECT OF COMBINED INTERNAL AND EXTERNAL BARRIER

The next experiment was designed to test the effect of an 'external' barrier when imposed upon an 'internal' barrier. That is to say when the Person is encountering a barrier in his actions, and experiencing Unpleasantness (U), what will be the effect on the Person's feelings by the imposition of the 'external' barrier?

The instructions to the 'O's' were the same^{as} in the preceding experiment with the single exception that the

'O's' were instructed to introspect carefully on the degrees of feeling U whenever U was experienced.

The 'E' permitted the progress of the game to continue, recording actions and introspections as before, until the 'O' was clearly encountering a barrier. This was determined by the introspections of the 'O' and by the objective evidence of his wavering or inactive hands. Thereupon the 'E' commanded, "No, not that", and recorded the introspections given.

Result: Of the six 'O's', 24 cases showed Unpleasantness experienced. Of these 24 cases, 12 cases showed Unpleasantness unchanged from the degree experienced by reason of the 'internal' barrier. The remaining 12 cases showed an intensification of U as a result of the 'external' barrier. In no case was change in quality of feeling reported. These results appear to bring out further evidence in support of (1) the barrier to action as the cause of Unpleasant feeling (U), and (2) the reality of the 'internal' barrier, because the same quality of feeling (U) was produced by both the 'internal' and the 'external' barrier. Differences in degree of U are explainable by re-enforcement of the original barrier.

(3) EXPERIMENTS ON INTENSITY OF FEELING

ON CHANGES IN FEELING BROUGHT ABOUT BY VARIATIONS OF INTENSITY OF ACTION

The next experiments were set up to vary the intensity of activity while keeping the other factors constant.

(A) INCREASE OF INTENSITY

After the 'O's' were thoroughly experienced in the activities of the game but were still finding it difficult to solve, they were given the following instructions:

"This game, as you perhaps know, can be solved. It has been solved by others. Records have been made of the length of time required by other adults for its solution. Now try to solve the game as quickly as you can. I will record the time it takes you to solve it." The 'E' then takes out a watch and tells the 'O' to begin.

This experiment hastened and intensified the activities of the 'O's'. The nine 'O's' taking part in this experiment revealed an intensification of the experience P when activity was unimpeded and also an intensification of the experience U when barriers were encountered as compared to the untimed experiments previously made. Introspections were few and brief due to the rapid action and excitement. The relatively few introspections given were in the form of outbursts denoting intense but brief feelings of P and likewise intense but more lingering feelings of U. The latter, in several cases took the form of swearing. Compared with former experiments no changes in quality of feeling were observed with the increase of intensity of action, but increase of intensity of feeling was observed to vary directly with increase of intensity of action.

(B) Decrease of Intensity.

The following experiment was designed to decrease the intensity of the action by increasing the degrees of

freedom of activity.

Instructions: The 'O's' were instructed as follows: Since it is difficult to make your introspections while working at high speed against time, you will now have whatever time you need to solve the problem and in addition we will change the rules in one particular. By this change of rules you are permitted to make your jumps not only in two axes as before, but also in a third axis; i.e. you may make jumps of pegs in a diagonal direction. Now begin.

Results: Of the nine 'O's' taking part, all of them showed a notable diminution of intensity of action and also diminution of intensity of feelings, both of P and U. Introspections were more freely given than in the former experiment. They revealed no changes in the quality of feelings observed as compared to the previous experiment. On the other hand, observations of 'O's' in 46 cases, 100% brought out that intensity of feeling was diminished as degrees of freedom of action were increased. The diminution of intensity of feeling varying with increase of degrees of freedom of action applied to both P and U. That is, lowering the intensity of action lowered the intensity of both feelings; and as before, the intensity of feeling varied directly with the intensity of action.

(4) Summary of Results.

In the foregoing experiments the field methodological approach and the method of Kurt Lewin were employed. Our purpose ^{was} to make observations on the relations of feeling to action. Observations were first made on the temporal relation of the feeling of Pleasantness (P) to action. It was found that in 99.57% of 781 cases where clear discriminations could be made the feeling (P) followed the action.

Similarly, observations were made on the relation of Unpleasantness (U) to action. Discriminations were more clear with respect to the feeling of Unpleasantness, and the feeling (U) was found to follow the action in 100% of the 452 cases. Our conclusions are from the experimental evidence at hand that feeling follows action in temporal sequence.

A second series of experiments was conducted to determine the quality of feeling experienced, whether P or U, in connection with 'free', i.e., unimpeded action toward the goal. It was found that the quality of feeling experienced as the result of 'free' or unimpeded action was invariably Pleasantness. Experiments to determine the quality of feeling experienced when the action is blocked by a barrier were then made. It was found that the feeling of Unpleasantness (U) invariably followed the blockage of an action by a barrier. Whether the barrier was the 'internal' one of lack of insight in solving the next move in the problem, or an 'external' one imposed by the 'E' into

the activity of the 'O's' made no essential difference in the results.

In connection with the above experiments on the production of U, an attempt was made to determine whether the quality of feeling can be changed from P to U under controlled conditions. Our findings tend to show that the answer to this question is in the affirmative. To change the feeling P attendant upon 'free' activity, to the opposite feeling U, it was necessary to change the dynamic situation underlying the actions and feelings. This was done by imposing a barrier in the way of a pleasant goal activity. This subject will be developed later in this chapter when we treat of the dynamic interpretation of P and U.

A third series of experiments was conducted with the object of determining whether intensity of feeling varies with intensity of action.

When the peg board game was played as an Intelligence Test and the 'O's' were instructed to perform as rapidly as possible in order to make a good record, it was observed that intensity of feeling both of P and U, rose directly with the rise of intensity of action. When the intensity of action was reduced by allowing the 'O's' unlimited time and increased degrees of freedom (for definition see Ch.IV), it was observed that with the lowering of intensity of action there came a corresponding lowering of intensity of feeling both of P and U. It would appear from these findings that intensity of feeling varies directly with intensity of action.

A DYNAMICAL INTERPRETATION OF PLEASANT-
NESS AND UNPLEASANTNESS.

For a dynamical interpretation of the findings of the foregoing experiments we will now make use of topological and dynamical terms which were previously defined (Ch. IV).

Summarizing the results, it was found (1) Feeling, whether P or U, follows action. The relation appears to be invariable and causal. (2) Feeling varies with the action; the intensity of the feelings P and U varying directly with the intensity of the action. (3) Quality of feeling can be changed experimentally from P to U. This was done by imposing a barrier in the way of pleasant action. Also, Unpleasantness (U) was changed experimentally to Pleasantness (P) by the removal of the barrier thus permitting 'free' activity i.e. locomotion toward the goal.

Interpreting the above phenomena topologically and in the terms of field dynamics it may be said of (1) that tensions in the field determine the activity of the Person, and in turn the locomotion of the Person with reference to the goal gives rise to the feelings experienced by the Person.

(2) Describing the actions in the same terms we may say that the activity of the Person may be described by the vector (Ch. IV). Since feeling was observed to vary directly with intensity of action, the vector in the field

may be said to be descriptive also of the emotive behaviour of the Person.

Interpreting (3) above in topological and field dynamical terms it will be recalled that a barrier placed in the way of a pleasant goal activity was instrumental in changing the feeling from P to U by changing the underlying dynamic situation in the field as a whole. As before, the behaviour of the Person in the field is described by the vector. The properties of the vector are direction and intensity as well as a point of application. 'Free' activity toward the goal is described thus by the vector in the field:  . It will be recalled that such an activity gives rise to Pleasantness.

We will turn now to the dynamic interpretation of Unpleasantness. Our experiments showed clearly that the feeling P could be changed experimentally to feeling U by the imposition of a barrier in the way of a free and pleasant goal activity. Such Pleasant activity was described above, thus:  . But when the barrier changed the feeling from P to U, the direction of the vector was likewise changed, thus:  . To repeat, this change in the dynamic activities was experienced invariably as a change from P to U.

Let us return now to the parallel processes of action and feeling, observed in Ch. V, Part 1. Isomorphism appears to prevail in the behaviour patterns of the Person's

actions and feelings. Both are explainable in dynamical terms because dynamical constancies are revealed in the relationship between action and emotive behaviour. Dynamic constancies may be considered as laws. Therefore, our dynamic interpretations of Pleasantness and Unpleasantness may be termed laws of P and U.

We will take up the description of dynamical laws of P and U, first verbally, then mathematically.

Let us recall our concept of force, of tension and of vector described in Chapter IV. Magnitudes may be described as tensions up to the point where they are resolved into a definite direction. When the property of direction may be ascribed to a magnitude, it is known as a force and represented by the vector. Tensions are thus potentials of the kinetic activities described by vectors. (Ch. IV).

The Person's affective states incident to tension in the field and incident to vectors have now been observed experimentally under controlled conditions. We will now proceed to describe the affective states of P and U and to interpret them in dynamical terms. The correspondence between psychological field forces and affective states (emotive behaviour) may be expressed as follows:

FIELD FORCES

EMOTIVE BEHAVIOUR

- | | |
|--|---|
| <p>1. Vector, representing
locomotion in the direction
of goal -----</p> <p>2. Vector, representing
locomotion toward goal
blocked by impermeable
barrier; vector of barrier
equalling vector of Person
but in opposite direction-----</p> | <p>Pleasantness (P)</p> <p>Unpleasantness (U)</p> |
|--|---|

3. Ditto with barrier
 vector of greater intensity
 than Person vector-----Unpleasantness

LAW OF PLEASANTNESS.

Pleasantness is experienced by the Person when his locomotion is proceeding toward the goal through a permeable region in the behavioural field.

LAW OF UNPLEASANTNESS.

Unpleasantness is experienced by the Person in the field when his locomotion toward the goal is blocked by an impermeable barrier.

This interpretation of Pleasantness and Unpleasantness may be expressed mathematically: (See end of Part 2 following).

Chapter V, Part 2.

ON FEELING X; A NEW TYPE OF FEELING DISCOVERED IN
EXPERIMENTING ON PLEASANTNESS AND UNPLEASANTNESS.

In this section an account is given of further experimentation to obtain additional data on a problem brought out in our former experiments. It will be recalled that an unknown feeling other than P and U was observed in the forgoing experiments on Pleasantness and Unpleasantness. (Ch. V. Part 1). The unexplained feeling was noted repeatedly during the course of our observations on P and U. It was recorded when observed by a simple notation under the heading 'Other feelings' (See Charts C and D). Due to the fact that it was an unknown feeling it was given the temporary working title, Feeling X. It should be borne in mind that feeling X was unexpected by the 'O's' and the 'E'. It was readily distinguished from P and U by its lack of the distinctive quality of Pleasantness and Unpleasantness. Feeling X, however exhibited positive qualities of its own which we desired to observe at a later date. Accordingly, detailed observations of Feeling X were postponed until the final year of our experimental work 1935-36. The 1935-36 series of experiments and observations will now be described.

(A) Initial Purpose.

The purpose of the experiments and observations now to be recorded was to make detailed observations on Feeling X under the following heads:

1. Qualitative characteristics, 2. Intensity.

The objective under (1) above was two-fold; to determine, first, the positive qualities of feeling X and, secondly, to describe its qualitative opposite adopted from Fitchener (Ch. III). We will postpone our account of the positive qualities and intensities of Feeling X until later (Ch. V. Part 2, (B)) because of difficulties encountered with our criterion of qualitative opposition to be shortly explained.

Observers.

Nine subjects served as Observers. Three were members of the Teaching Staff of the Department of Psychology at the University of Kansas. The other six were Graduate students in the department. Incidentally it should be mentioned that with these psychologically trained 'O's' more precise and elaborate data were obtained in experiments up to this point than was possible with our untrained observers; but the observations of the trained group differed from those of the untrained group largely in the greater precision and detail of the former. In no case did the observations of the trained group nullify the simpler data of the untrained group of Observers.

Procedure.

The Procedure with peg board game, the 'O's' introspections, technique of observation and recording were the same as before (Ch. V, Part 1, (B)).

We will now discuss the Criterion of qualitative opposition because it has an important and troublesome relation to the factual data obtained in our experiments.

The criterion of qualitative opposition was held by both Wundt and Titchener. It derives from Wundt's concept of paired opposites as set forth in Wundt's tridimensional theory. The notion of paired opposites implies a neutral point between the opposite pairs of feelings. We, having adopted the criterion of qualitative opposition (Ch.III) assumed the existence of neutral point between P and U, and had accordingly laid out our graph representing the feelings with a neutral zone (See. Fig. 3 and Fig. 4.). The neutral zone was midway between P and U. This was done under the assumption made by conventional psychology (Wundt 1896; Titchener 1908;), that logically between qualitative opposites such as P and U there must be a neutral point. It is recalled that Titchener had limited feeling elements to P and U. If the Wundt-Titchener schema were true, and if the criterion of qualitative opposition were sound, it would follow that the middle point between P and U, should be characterized by the absence of P and U and also by the absence of feeling of any kind. Wundt's tridimensional theory leads us to the same conclusion. Wundt's three pairs of opposites were conceived to meet at a common point, a point devoid of feeling. (See Fig.7, and note Titchener's text quoted thereunder).

During the course of our former experimentation (Ch.V, Part 1) it was found that the Wundtian concept of the neutral point between the feeling opposites P and U was of doubtful existence. We found a zone between P and U in which

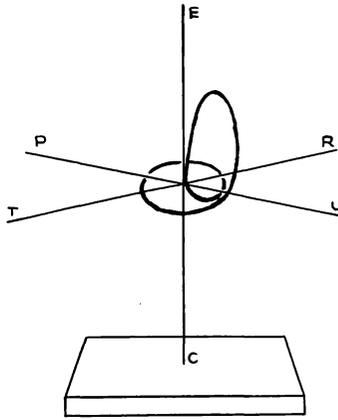


FIGURE 7

"Diagram representing the course of a typical sense-feeling, according to Wundt's theory. The feeling sets in as a mixture of excitement and unpleasantness, to which tension is soon added. It then drops into the region of pleasantness and calm, takes on a tinge of relaxation, and so ends at the indifference-point from which it started."

After Titchener (1926, p.250)

feelings of P and U were lacking, but which exhibited positive feeling qualities of its own. This was Feeling X mentioned above at the beginning of Chapter, Part 2.

Our 1935-36 experiments now to be described confirmed our doubts as to the existence of Wundt's 'indifference point', a point devoid of all feeling. We found no point devoid of feeling, no 'indifference point'. All nine 'O's were unanimous in this. Wundt's schema of his tridimensional theory (See Fig. 7) in the light of our experimental findings turns out to be a somewhat pretty picture but an utterly meaningless one. We find it illogical, as Titchener says it is (1926, p.251 ff), and psychologically not in accord with the data of experiment.

What then of the criterion of qualitative opposites which is derived from Wundt's postulates? Can we experimentally find the qualitative opposite of Feeling X? After carefully determining the positive characteristics of Feeling X we were unable to find any qualitative opposite to it. Therefore, on the basis of experimental data and of logic we were forced to abandon Wundt's criterion of qualitative opposition, to which Titchener held in spite of his condemnation of Wundt's logic. (Op.cit.p. 251 ff.), and to proceed with our observations of Feeling X with open minds but with the criterion of qualitative opposition dropped from our list (See Ch.III). We were then obliged to revise our plan of experimentation.

(B) Final Plan of Experimentation and Observation.

Our Observers were instructed to play the peg board game and introspect on Feeling X exactly as the feeling was experienced. Their introspections cover ten aspects of Feeling X as follows:

- (1) Qualitative characteristics;
- (2) Spatial relation to the behavioural field as a whole;
- (3) Spatial relation to Pleasantness (P) in the field;
- (4) Spatial relation to Unpleasantness (U) in the field;
- (5) Temporal relation to Pleasantness (P);
- (6) Temporal relation to Unpleasantness (U);
- (7) Relation to the activity of the Person;
- (8) Genetic relation of Feeling X to P and U;
- (9) Relation of Feeling X to the dynamics of the field;
- (10) Degrees of intensity of Feeling X;

It may be mentioned that no suggestions were given the 'O's' as to what characteristics or qualities they were expected to note, with one exception. This exception pertains to the set of directions covering degrees of intensity under heading (10) noted above.

(C) Following is a description of Feeling X, abridged from copious introspections. As far as possible it will be given in the words of the Observers.

(1) Qualitative characteristics. Characteristic qualities of Feeling X were observed to be "a definite experience... feeling tension dimension.... I feel the broadness of the experience. Neither P nor U, a bulkier type of feeling with strain or tension. A strain in my system. I feel a tension that is anticipatory, more so than P or U. The feeling is like a vacillation of action".(Observer Pkn). "A neutral feeling, a feeling of puzzlement. It is dynamic. Neutral feeling of tension. An excited feeling. (Observer Prt). "Observe distinct tension feelings. The tension dimension continued throughout the game". (Observer W.) "A general totality feeling, kineasthetic. A certain thrill feeling." (Observer Vth). "A distinct energized feeling, a strain or tension requiring action to relieve it" (Observer S). "This feeling has a real character but it is neither Pleasant or Unpleasant. A feeling of indefinitness, I am aware of the goal all right, but the goal is far away. I am aware of considerable tension, tension demanding activity a feeling of tension that makes me want to get going. (Observer Blg.) In no case was there observed a qualitative opposite to Feeling X.

(2) Spatial relation to the behavioural field as a whole.

"I feel the broadness of the experience. Neither P nor U. A bulkier type of feeling" (Observer Pkn).

"X feeling has reference not to a specific move but is more general. It has reference to getting the whole thing done--reaching the goal". (Observer W).

"General tension not relieved by action or a game...

General tension rises as I proceed from game to game".

(Observer W.) "Not particularly localized; radiates over the whole organism". (Observer Py.) "Continued throughout the game", (Observer W) i.e., throughout the behavioural field. "The feeling is general, not localized". (Observer Prt).

(3) Spatial relation to Pleasantness^(P) in the field.

"Feeling of tension comes in waves or spurts---rises to P. (Observer W.)" A slight rise in feeling with a slight release of tension." (Observer Brn).

(4) Spatial relation to Unpleasantness, (U) in the field, "The feeling is like a vacillation a feeling toward unpleasantness then back to the first feeling of vacillation". (Observer Pkn). "Blockage and cognition of the blockage brings on disgust (U)", (Observer W.) "A certain thrill feeling I wouldn't want to continue. A shade of anger in it. Easily goes over into U." (Observer Vth).

(5) Temporal relation to Pleasantness (P).

"General tension, then rises to P continues throughout game [after P had subsided]". (Observer W). "Tension slightly relieved by action--insight into move brings a momentary feeling of success (P)" (Observer V). "Tension a positive experience, neither P nor U, going on at the same time that I experience P". (Observer V.)

(6) Temporal relation to Unpleasantness (U).

"Feeling of tension going on at the same time I experience U". (Observer V). "Pushing intensity-feeling, goes over into a mild Unpleasantness". "Feeling of intensity starts before U". (Observer Py). "Tensions high while

planning, recognized blockage, Unpleasantness develops very quickly." (Observer Pkm).

(7) Relation to the activity of the Person.

"Cognition followed the major part of the action, cognition emerged at the peak of the action and appeared to be a differentiation out of the action. Feelings ensued after cognition. The type of feeling experienced whether P or U, was determined by the action. Tensions determine activities, activities determine feelings". (Observer W). "Actions before thought", "actions preceded feelings". (Observer V). "The tension builds up on every move until the move is made. I am aware of a constant flow of tension that cannot be satisfied with any single move". (Observer Bdg).

(8) Genetic relation of Feeling X to P and U.

" X Feeling rises to P". (Observer W). "From feeling like vacillation [Feeling X] of action---toward Unpleasantness, then back to the first feeling". (Observer Pkm). " Feeling X easily goes over into U". (Observer Vth). "A surge of tension exploding like a dam breaking then released. I had missed it by one move. Dropped to U₃". (Observer V).

(9) Relation of Feeling X to the dynamics of the field.

This relation was calculated by the experimenter and will be given at the end of this chapter.

(10) Degrees of intensity of Feeling X.

Seven of the nine 'O's' were instructed to introspect on degrees of intensity. The introspections were recorded on a graph. Results are shown in Figs. 9 and 10. Where

Feeling X starts at the beginning of the activity in the first degree of intensity, rises gradually as an expanding total pattern of feeling which reaches its peak just before the goal is reached.

Contrasting Feeling X with P and U as to intensity and energy effects, Observer Bdg., made the interesting report that Feeling X "contains more amperage than P and U," while "the hedonic tones of P and U possess the sharper characteristic of voltage".

SUMMARY OF OBSERVATIONS ON FEELING X.

A summary of findings with reference to Feeling X will now be given under headings outlined above:

(1) Qualitative characteristics. Characteristic qualities of Feeling X were observed to be feeling of tension, of excitement, of expectancy, vague and unlocalized, an energized state of the organism, a readiness for action. A distinctive characteristic of Feeling X is its total absence of either Pleasantness or Unpleasantness. It exhibits no qualitative opposition. In all other respects it meets Fitchner's and our criteria of feeling. When the data of experiment falsified the criterion of qualitative opposites, we were forced to adhere to the

evidence from experiment and abandon the false criterion.

(2) Spatial relation to the behavioural field.

Feeling X was observed to pervade the entire behavioural field from the formation of the field to the closure.

It was particularly noticeable in the neutral zone where it was first discovered, and where P and U were not rivals for attention. See Fig. 8.

(3) Spatial relation to Pleasantness (P). Feeling X was observed wherever Pleasantness (P) was observed in the field. See Fig. 8.

(4) Spatial relation to Unpleasantness (U). Feeling X was observed in all parts of the field where Unpleasantness (U) was observed. See Fig. 8.

(5) Temporal relation to Pleasantness (P). In point of time Feeling X preceded feeling P; it also succeeded P temporally.

(6) Temporal relation to Unpleasantness (U). Again in point of time Feeling X preceded Unpleasantness (U) and also was observed to succeed U in temporal sequence.

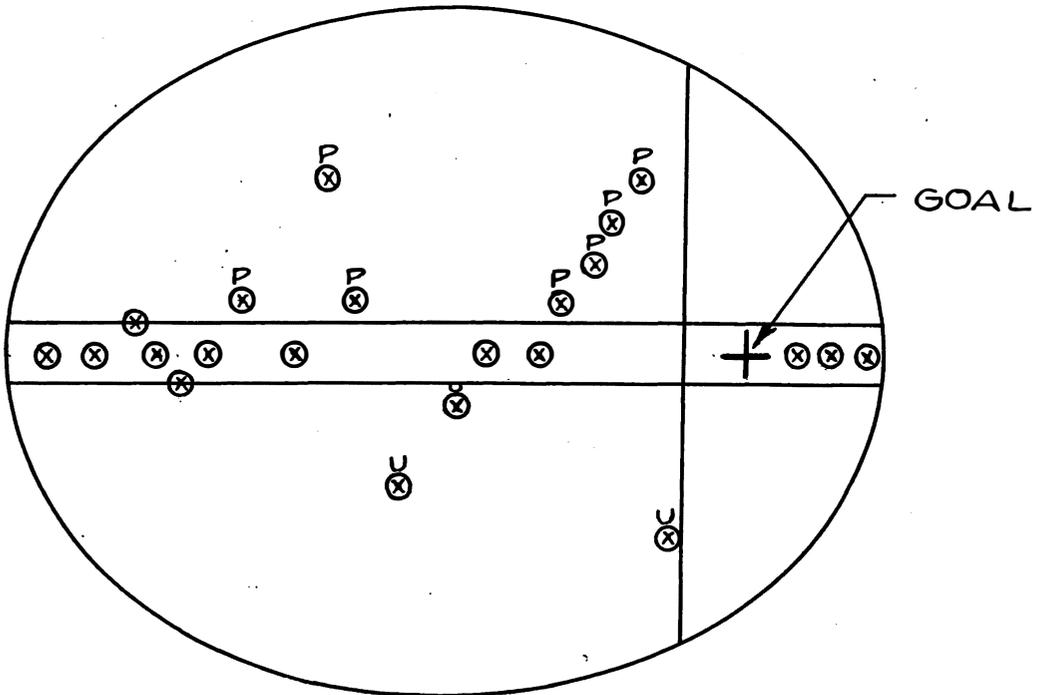
(7) Relation to the activity of the Person.

Feeling X was experienced when the Person was aware of his goal, but before locomotion toward the goal had begun.

It was also experienced as the Person had reached the goal and his activity no longer had a definite direction.

FIGURE 8

Showing spatial relation of Feeling X, Feeling P, and Feeling U to the field. Showing also the spatial and genetic relationships between Feeling X and the Feelings P and U.



⊗ = LOCATION OF FEELING X IN THE FIELD

P = LOCATION OF PLEASANTNESS (P) IN THE FIELD

U = LOCATION OF UNPLEASANTNESS (U) IN THE FIELD

$\overset{P}{\otimes}$ = FEELING X SHOWING DIFFERENTIATION INTO P

$\underset{U}{\otimes}$ = FEELING X SHOWING DIFFERENTIATION INTO U

The repeated descriptions of Feeling X as a feeling led us to look for its qualitative opposite in accordance with the criterion of qualitative opposition (Titchener). But the experimental data given by our nine 'O's' in a series of observations lasting approximately one year, meeting three times a week, revealed this significant datum: Feeling X exhibited no qualitative opposite. Our 'O's' found differences in the degrees of intensity of Feeling X but these were plainly differences not in kind but in degree. We will return to a further description of these differences in the degrees of intensity when a description of two additional series of experiments will be given later (B-(1) of this Chapter).

Since Feeling X failed to meet our criterion of qualitative opposition, the question then was asked: Is Feeling X a feeling, or does it belong in the category of sensation? Due to its lack of the attribute of clearness and its nonlocalization it was plainly not a sensation. In all other respects than that of qualitative opposition it met the criteria of feeling. (Ch.III). The conclusion was then drawn that when the experimental data falsifies the criterion, then the criterion must be inadequate or false.

Another explanation was needed. A possibility suggested itself: perhaps the qualitative opposite of P and U have become opposites by a process of differentiation. If so they might be differentiations or individuations, out of an undifferentiated whole. Feeling X might be that undifferentiated whole feeling. If so, it should exhibit the characteristics of organized wholes. By this we mean

such properties as 'solidity'; as an undifferentiated 'looseness' or 'ground' character in contrast to the 'solid' or 'figure' character (Köhler, 1929, p. 219) of the feelings P and U. Also, it might exhibit an intensity gradient.

Here was a problem to inquire into. Accordingly, additional experimental observations were conducted to determine: (8) the genetic relation of Feeling X to feelings P and U, (9) the relation of Feeling X to the dynamics of the total field, (10) the degrees of intensity of Feeling X and the possibility of an intensity gradient.

Plan of Experimentation for (8), (9), and (10).

Our same nine 'O's' using the peg board game with the same procedure as in former experiments were instructed to introspect carefully on (8) the genetic relation of Feeling X to feeling P and U, and (9) the spatial position of Feelings X, P and U to the behavioural field; and finally (10) on degrees of intensity of Feeling X.

(8) Results are shown in Fig. 8 where one sample of many similar observations is given. It will be noted that Feeling X is experienced in the neutral zone, in the Pleasant zone, and in the Unpleasant zone of the field. Also, it was observed both before and after the goal was reached. The genetic relation of Feeling X to P and U was not difficult to observe. Feeling X was clearly an undifferentiated feeling pattern out of which P and U are individuated as partial patterns. When feeling P

individuated or emerged from Feeling X, P became more poignant and definite than X, but Feeling X could easily be observed as a background. Likewise when feeling U was individuated out of Feeling X, the change of feeling into Unpleasantness was quite distinct; and the more vivid or poignant feeling U leaped to the foreground. But on careful observation the background feeling (Feeling X) could be discerned. The relation is that of figure (feelings P and U) to ground (Feeling X). (Cf. Rabin, 1921, who observed similar phenomena in the field of visual perception.)

(9) Relation to dynamics of the field. Feeling X is interpreted to be the direct experience (Köhler) of field tensions. By definition, field tensions lack the property of direction. Moreover, activities having the property of direction give rise to feelings P and U. (Ch. V, Part 1). Pleasantness (P) is the direct experience of locomotion through a permeable region in the direction of the goal. On the other hand, Unpleasantness (U) is the direct experience of locomotion blocked by an impenetrable barrier. Individuations of Feeling X come about by reason of the dynamic situation of the field as a whole. When the field tensions without direction attain direction and give rise to locomotion toward the goal, corresponding differentiation takes place in the experiential phenomenon: Feeling X differentiates into feeling P. On the other hand, when field tensions attain the property of direction and give rise to locomotion that is blocked by a barrier, the

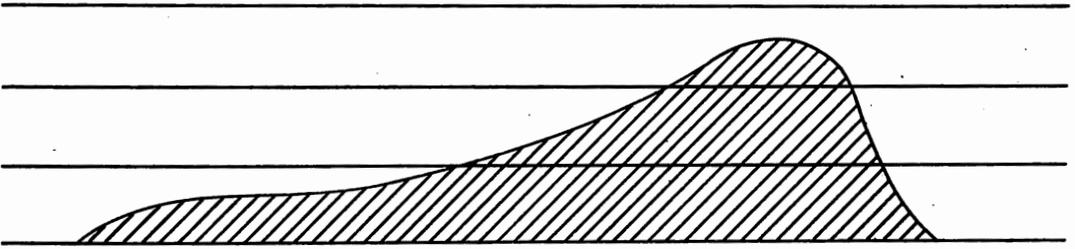


FIGURE 9 (above)

Feeling X or Tension-Feeling.

Profile of Feeling X showing intensity gradient with three degrees of intensity.

Note that Feeling X or Tension-Feeling exhibits an expanding total pattern of feeling. (Cf. G. E. Coghill, 1929, p. 88).

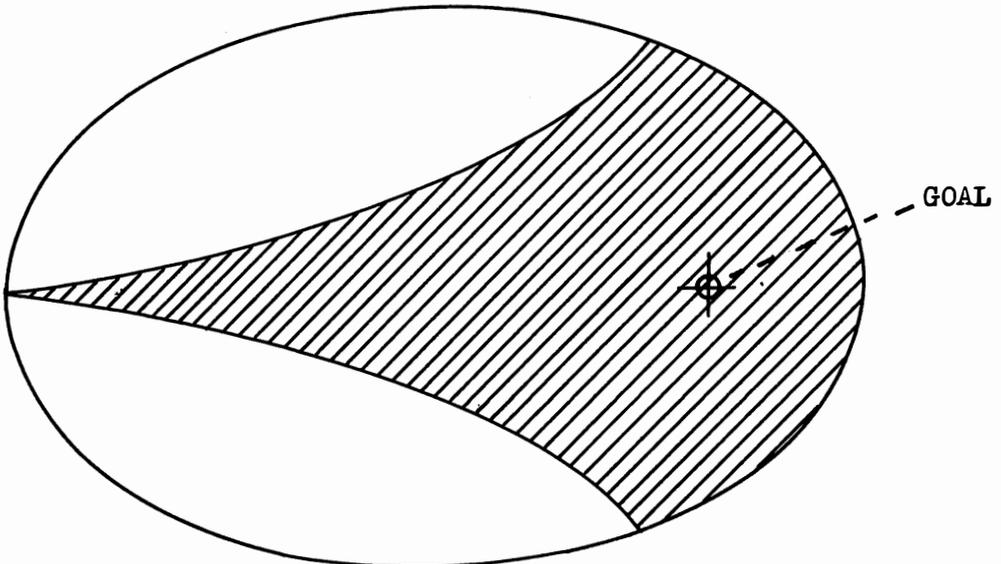


FIGURE 10

Intensity gradient of Feeling X in relation to the field. The gradient of Feeling X (Tension-Feeling) exhibits a minimum intensity at formation of the field, when goal is perceived, and attains its maximum just before goal is reached. (Cf. C.M. Child, 1921, on excitation gradients).

resulting experiential phenomenon is a differentiation of Feeling X into feeling U. (See Fig. 8).

(10) Degrees of intensity of Feeling X.

A final series of observations was made to determine whether differences in intensity in Feeling X could be observed. Seven 'O's' making approximately 150 observations described Feeling X in three degrees of intensity. (See Fig. 9). The degrees of intensity were observed in the form of a gradient, the minimum of the intensity gradient being at the formation of the field, and reaching its maximum just before the goal. The intensity gradient is shown in two aspects, Fig. 9 and Fig. 10. The upper drawing (Fig. 9) is a schematic outline of the expanding pattern of feeling. It is shown in profile with three degrees of intensity as described by the 'O's'. In the lower drawing, Fig. 10, the intensity gradient of Feeling X is shown in relation to the behavioural field. It will be noted that the gradient starts at the formation of the field, and expands as the goal is approached. This is in accordance with the law of increasing energy. (Wheeler). It is also in accord with the properties of the intensity gradient as observed by Child on excitation in the organism. (C. H. Child, 1921).

INTERPRETATION OF TENSION-~~FEELING~~, DESCRIBED
HERETOFORE UNDER THE WORKING TITLE,
FEELING X.

We are now ready to interpret Tension-Feeling in the light of our results and in the light of dynamic-topological concepts.

(1) The first feeling to appear introspectively in the experimental situation is undifferentiated tension (strain) or activity feeling which may or may not undergo a differentiation into P and U, but usually as the experiment proceeds, does differentiate in the direction of P or U in accordance with the individual's progress to^{ward} the goal.

(2) This undifferentiated feeling which we have called Feeling X and shall now call Tension-Feeling is not qualitatively specific and may or may not appear phenomenologically to the observer as muscular tension.

(3) In terms of dynamic topological concepts, Feeling X is interpreted as the phenomenal aspect of a condition of dynamic tension between the organism and its field. When this tension between the organism and the field becomes a force having vector characteristics, the feeling differentiates. When the force is resolved freely in the direction of the goal, the feeling differentiates into pleasantness. When a barrier interposes between the observer and the goal, ~~the~~ Feeling X differentiates into U, inversely as the permeability of the barrier.

This interpretation has the advantage first of explaining the diffuseness and non-localization of the original Feeling X, for the feeling is a symptom of a relationship

between the organism and its field, which has yet to become differentiated or structured. Then the specific characteristics of the organism-field relationship conditions the specificity of the differentiated feeling.

The interpretation just given is supported by the following results ^{from} of our experiments.

(1) TF (tension-feeling) was observed never to appear in situations in which the relationship between the person and the field could not best be described by means of dynamic constructs.

(2) TF continued as long as the field conditions, as defined by dynamic constructs, were maintained.

(3) TF increased in intensity directly with the control of field conditions as determined by dynamic constructs.

(4) When, in terms of definition, the psychological field was so structured that the force (vector) was reduced or resolved, TF diminished and disappeared.

(5) TF ceased shortly after the resolution of field forces, that is, with the attainment of the goal or with flight from the situation before reaching the goal.

(6) Resumption of TF with repetition of trials or by return of the person to the experimental situation before attaining the goal, also supports our view.

SUMMARY

1. The atomistic-mechanistic approach to the problem of feeling has been shown to be inadequate both from an historical and experimental point of view.
2. The field theoretical approach has been adopted as a substitute, with the result that pleasantness and unpleasantness have been ordered to dynamic topological constructs. Logically this necessitated a repudiation of atomistic psychology in the following respects:

(a) P and U are not qualitative opposites.

(b) P and U are not elements of consciousness.

In place of these views we have found that P and U are differential resultants of a primary general feeling that can best be described as strain-, active-, or tension-feeling.

3. Action is a necessary condition for the appearance of P or U.
4. P is experienced by the person when his locomotion is proceeding toward a goal through a fluid field.
5. U is experienced by the person when his locomotion toward the goal is blocked by a relatively impermeable barrier.
6. P and U have no psychological meaning except in terms of the dynamics of a total field of which the person is a part.
7. Intensity of feeling varies directly with intensity of action. When those field conditions are set up that can be defined in terms of vector intensity, feeling increases. When the conditions of the field are changed in accordance with vector decrease, feeling decreases.

8. TF exhibits the non-specific but positive qualities of expectancy, heightened energy, general muscular tension, and alertness. These are distinct from the qualities of P and U. These qualities appear before the goal is differentiated in terms of specific field conditions.

9. TF exhibits an intensity gradient, ranging from low intensity at the beginning of the person's activity in the field, to maximum intensity as the goal is approached. This is in accordance with the Law of Increasing Energy.

10. TF as here defined differs from Wundt's Totalgefühl in that the latter was logically compounded of psychic parts, which fused. In the present view, the more general feeling comes first and the specific comes second. The general feeling is not a product of synthesis, and the specific feeling P or U are the results of individuation.

11. Phenomenally, Titchener failed to improve upon Wundt because his theory of feeling was based, like Wundt's, upon atomistic and purely structural constructs, which have been avoided in this investigation. Phenomenally, P and U are not elements nor qualitative opposites nor varieties of pressure.

12. We have already expressed the main difference between our position and Wundt's in that Wundt's Totalgefühl is a synthetic product, a derived whole, while our Tension-Feeling is a field property of the organism as a whole. This field property is primary in character, from which other feelings differentiate.

13. In our conception, unlike that of McDougall's, P and U are not causes of action, but symptoms. In this we are in

agreement with the position of Wheeler and Perkins (1932, pages 360 and 361). Not feelings but tensions, or better, differentials of potential within a unified field, are the conditions of action.

14. We differ from Paulhan (1930, Page 82) in that his "arrest of tendency" theory, and other similar theories going back to the Ancient Greeks, merely specify the objective conditions for the usual appearance of P and U without explaining how those conditions (facilitation and frustration) can produce feeling.

15. We are more sympathetic towards Stratton's (1928, pages 215-221) view, that, basic to varieties of feeling is a general feeling of "excitement". However, "excitement" according to Stratton, may as such be pleasant or unpleasant. Hence his theory lacks the principle of individuation. He does not explain how pleasantness or unpleasantness can arise. In short, Stratton makes "excitement" just another feeling element.

16. Our investigation demonstrates the fruitfulness, for the study of feeling, of ^{the} a dynamic-topological method as pursued by Lewin and Brown, and, organismic or field concepts as developed by Gestalt Psychology especially in the work of Wheeler and Perkins. Further, our results are in harmony with the general position assumed by physiologists and neurologists relative to the principles of gradients and individuation. (Child and Coghill)

CHAPTER VII
BIBLIOGRAPHY

- Allport, F. H., 1924, *Social Psychology*, Cambridge, Mass.
- Bain, A., 1899, *The Emotions and the Will*, p. 13
- Beebe-Center, J. G., 1935, In *Psychology, a Factual Text-book*. Boring, et.al. Ed.
- Bridgman, P. W., 1927, *The Logic of Modern Physics*. MacMillan, N.Y.
- Brown, J. F., 1931, *The Visual Perception of Velocity*.
Psychol. Forsch. 14, pp. 199-232
- _____ 1934, *A Methodological Consideration of the Problem of Psychometrics*. *Erkenntnis*, 4, pp. 46-61
- _____ 1935, *The Mathematical Conceptions Underlying the Theory of Psychological and Social Fields*, Edwards Bros. Inc., Ann Arbor, Michigan
- _____ 1935 a, *Toward a Theory of Social Dynamics*, *The Journal of Social Psychology* 6, pp. 182-213
- Brunsvik, D., 1924, *J. Comp. Psychol.* 4
- Bühler, K., 1924, *Die geistige Entwicklung der Kindes*, 4 Aufl. Jena (First Ed. 1918)
- _____ 1928, *Wittenberg Symposium*, pp. 195-199
- Child, C. M., 1921, *The Origin and Development of the Nervous System*. Univ. Chicago Press. Chicago
- _____ 1924, *Physiological Foundation of Behavior*. Holt. N.Y.
- Clifford, W. K., 1887, *Elements of Dynamic*. 2 vol. MacMillan, London
- Coghill, G. E., 1929, *Anatomy and the Problem of Behavior*. The Macmillan Co., N.Y.

- Dunbar, T., 1931, Der Ärger als dynamisches Problem.
Psychol. Forsch. 15, pp. 1-144
- Dewey, John, 1904, I, Emotional Attitudes. Psychol. Rev.
1, pp. 553-569
- Frobes, J., 1929, Lehrbuch der experimentellen Psychologie
Herder & Co. G. M. B. H. Verlagsbuchhandlung Freiburg im
Breisgau
- Gengerelli, J. A., 1934, Brainfields and the Learning
Process. Psychol. Mon. 203
- Gottschaldt, K., 1926, Über den Einfluss der Erfahrung
auf die Wahrnehmung von Figuren. I. Psychol. Forsch
9, pp. 261-317
- _____ 1929, (Same Title) II. Psychol. Forsch. 12, pp. 1-37
- Harlow and Stagner, 1932, Psychology of Feelings and
Emotions, I, Theory of Feelings. Psychol. Rev. 39,
pp. 570-599
- Heisington, L. B., 1928, Pleasantness and Unpleasantness
as Modes of Bodily Experience. The Wittenberg Symposium
Clark Univ. Press, Worcester, Mass. pp. 237-240
- James, W., 1890, The Principles of Psychology
- Janet, P., 1928, Fear of Action as an Essential Element in
the Sentiment of Melancholia. The Wittenberg Symposium
pp. 297-309
- Karsten, A., 1928, Psychische Sättigung. Untersuchungen
zur Handlungs- und Affektpsychologie, V. Bd. by E.
Lewin. Psychol. Forsch. 10, pp. 142-254

- Koffka, K., 1925, 1934, *The Growth of the Mind*. N.Y.
Harcourt, Brace and Co.
- _____ 1935, *Principles of Gestalt Psychology*. N.Y.
Harcourt, Brace and Co.
- Köhler and Koffka, 1912, see Wertheimer
- Köhler, W., 1920, *Die physischen Gestalten in Ruhe und im stationären Zustand* Braunschweig
- _____ 1929, *Gestalt Psychology*. N.Y. Liveright.
- Dippers, H., 1919, Über die deutung der plethysmographischen Kurve, in *ZPs*, 31
- Ladd and Woodworth, 1911, *Physiological Psychology*. pp.
501 ff., 531
- Landis, C., 1924, *General Behaviour and Facial Expression*.
J. Comp. Psychol. IV, pp. 447-501
- Landis and Gullotta, 1925, *J. Comp. Psychol.* V, p. 243
- Landis, C., 1935, *Psychology, a Factual Textbook*. p. 398
- Lashley, K. S., 1924, *Studies of Cerebral Function in Learning*, VI, *Psychol. Rev.* 31, pp. 369-376
- _____ 1930, *Basic Neural Mechanisms in Behavior*. *Psychol.*
Rev. 37, pp. 1-24
- Lewin, K.,
- _____ 1931 a, *The Conflict Between Aristotelian and Galilean Modes of Thought in Psychology*. *J. Gen. Psychol.* 5, pp. 141-177
- _____ 1935, *A Dynamic Theory of Personality*. N.Y. p. 135
- Lindsorsky, J., 1931, *Experimental Psychology*. N.Y.

- McDougall, W., 1910, Introduction to Social Psychology.
Boston: Luce.
- _____ 1923, Outline of Psychology. N.Y.
- _____ 1933, The Energies of Men. Scribner's, N.Y.
- Marston, W. M., 1928, Emotions of Normal People. N.Y.
and London.
- Mafe, J. P., 1924, An Experimental Study of the Affective
Qualities. Amer. J. Psychol. 35, p. 507, 540
- Paulhan, F., 1930, The Laws of Feeling. Harcourt, Brace
and Co. N.Y., and Kegan Paul, London
- Peterson, J., 1916, Completeness of Response as an
Explanation Principle in Learning. Psychol. Rev. 23,
pp. 153-163
- _____ 1927, Forced Adjustment vs. Association in Con-
structive Learning and Thinking. Amer. J. Psychol. 39,
pp. 264-282
- Piéron, H., 1928, The Wittenberg Symposium. pp. 284-294
- Ritter, W. E., 1919, The Unity of the Organism. 2 vol.
Boston
- Ritter and Bailey, E. W., 1928, The Organismic Conception:
Its Place in Science and its Bearing on Philosophy.
Univ. of Calif. Pub. Zool. 31, pp. 307-368
- Rubin, E., 1921, Visuelle Wahrgenommene Figuren
- Sherman, M., 1927, The Differentiation of Emotional
Responses in Infants; I. Judgments of Emotional
Responses From Motion Picture Views and From Actual

Observation: II. The Ability of Observers to Judge the Emotional Characteristics of the Crying of Infants, and of the Voice of an Adult. J. Comp. Psychol. 7, pp. 265-284; 338-351

Stratton, G. M., 1925, Anger: its Religious and Moral Significance.

_____ 1929, The Function of Emotions as Shown Particularly in Excitement. Psychol. Rev. 35, p. 351 ff.

_____ 1928 a, The Wittenberg Symposium.

Thompson, D'Arcy., 1917, Growth and Form. Cambridge: Univ. Press. pp. 793

Thompson, J. J., 1907, The Corpuscular Theory of Matter.

Thorndike, E. L., 1914, Educational Psychology, Briefer Course. N.Y. pp. 53-66

Titchener, E. B., 1909, The Psychology of Feeling and Attention. MacMillan, N.Y.

_____ 1926, 1925, A Textbook of Psychology. N. Y. 1919, 1909

Tolman, E. C., 1923, A Behavioristic Account of the Emotions. Psychol. Rev. 30, pp. 217-227

Warren, H. C., 1919, Roman Psychology. p. 284 ff.

Webster, A. G., 1925, The Dynamics of Particles and of Rigid, Elastic and Fluid Bodies. 3rd Ed. Leipzig - F. B. Teubner

Weiss, A. P., 1928, The Wittenberg Symposium. n.p. 174

Wertheimer, M., 1912, Experimentelle Studien über das Sehen von Bewegung. Zeit. f. Psychol. 61, pp. 161-265

Wheeler, R. H., 1929, *The Science of Psychology*. Crowell.

N.Y.

Wheeler and Perkins, 1932, *Principles of Mental Development*.

T.Y. Crowell Co., N.Y.

White, W. A., 1931, *Medical Psychology*

Willoughby, R. H., 1931, *Willoughby Emotional Maturity*

Scale, Stanford Univ. Press. Stanford Univ., Calif.

Woodworth, see Ladd

Wundt, W., 1896, 1930., *Grundriss der Psychologie*, 14th

edit. Stuttgart

Young, P. T., 1938, *Motivation of Behavior*. N.Y. John

Wiley and Sons. London, Chapman and Hall