Psychologists have maintained a large indirect interest in a concept of the unconscious even though the direct expression remains relatively small. Some of the more obvious evidences of this interest are contained in the literature on concepts of perceptual defense and vigilance, subliminal stimuli, learning without awareness of what is learned, hypnosis, dreams, projective techniques. Less direct expressions of interest in the unconscious aspects of personality are found in the following topics: insight problems in psychotherapy, unverbalized anxieties, certain problems in self-evaluation and some aspects of perceptual and cognitive theories.

The more explicit interest might be looked for in the *Annual Review of Psychology*. However, during the past ten years no writer summarizing personality theory has found it necessary to use the term unconscious as a category in his outline. Even so, the curious fact is that most of personality theory depends heavily, although tacitly, upon the Freudian bifurcating concept of conscious-unconscious, while at the same time the theories profess the concepts of unity and integrity of personality. But Freudian doctrine and modern personality theory at the point of the unconscious are mutually contradictory. This seems to be less clear than is desirable and necessary.

Miller's *Unconsciousness* (20) is still the major attempt of the past twenty-five years to define and systematize the concept of the unconscious. However, the Miller monograph and psychological literature in general tend to follow the Freudian orthodoxy which consists essentially of the following assumptions: (a) the dichotomy of conscious-unconscious is valid, (b) the unconscious contains the major sources of motivation, (c) conscious processes — even if recognized theoretically — are of little consequence in behavior, (d) an individual is not likely to discover anything of importance about his own unconscious without professional help, (e) an individual’s uncorrected explanation of his own behavior is of little or no validity because of the manifold protective resistances between conscious and unconscious processes.

Thus, it may be found that both theory and experiment have become overly dependent upon the derivatives of the Freudian system.
The writer has been offering in the recent past (5, 6, 7, 8, 9) a theory of conscious function which seems necessarily to lead to a revision of the conscious-unconscious dichotomy.

Dichotomies in biological and psychological subject matter should be thought of as superficial and tentative as well as covering only temporarily a more basic, integrative dimension or continuum. Kurt Lewin pointed out nearly thirty years ago that, "In modern quantitative physics, dichotomous classifications have been entirely replaced by continuous gradations" (18, p. 4).

The purpose of this article is, therefore, to offer a revision of the concept of the unconscious that will fit the context and implications of the theory of consciousness already outlined.

**Review of a Theory of Consciousness**

Previous papers have outlined a concept of a dynamic, regulatory and behaviorally effective consciousness in contrast to the traditional static, ineffective, epiphenomenal consciousness of the more recent past.

The descriptive adjectives used in the first part of the preceding sentence are similar to those that many writers have used for indicating the nature of the unconscious and its role in behavior. This latter approach has rested on the assumption, often implicit, that unconsciousness was close to or directly derived from the physiological processes of the organism and, therefore, effectiveness of the unconscious in behavior should be expected. Consciousness, on the other hand, has been assumed to represent another order of phenomena from which we should not expect a dynamic role in organismic activity.

It is hoped that this essay will contribute to the systematic conceptualization of an integrated, holistic organism from which no function needs to be excised in order to satisfy an orthodoxy of methodology. However, this purpose cannot be achieved without an integration of the traditional concept of the unconscious into the present functional theory. There is complete agreement here with Adler’s point, “We cannot oppose ‘consciousness’ to ‘unconsciousness’ as if they were two antagonistic halves of an individual’s existence” (1, p. 233).

In order to achieve this integration, a brief review of previous papers by the writer is necessary. The phylogenetic, functional theory of consciousness which has been presented has indicated both a physiological origin and an action role for consciousness at all stages
of ontogenetic and phylogenetic development. Three developmental functional levels have been described (9, pp. 21-23):

**Level I.** This is characterized by a generalized tissue feeling basic both to unifying the organism and to lending orientation and direction to movement. This rudimentary tissue feeling is assumed to be the resource from which all phylogenetically later developments of consciousness are derived. In the more complex organism both the resource and later derivatives are retained in functional unity. Only man has been successful in fracturing this unity into a pseudo-dualism in the interests of special theory or religious belief.

Furthermore, this resource of tissue feeling may be conceptualized as more fundamental than appears at first sight. A triple set of characteristics, which conceivably converge at the level of the cell, are: (a) the capacity to disseminate some kind of influence that communicates and maintains cellular integrity, (b) the rudimentary capacity for a generalized feel, and (c) the quality of being alive. Regarding (a), so much attention has been focussed on the transmission of a nerve impulse in fibers that not much is known of this more fundamental kind of transmission. It is assumed that the convergence of these three characteristics is sufficiently acute and interdependent that to solve the problem of one, will result in the solution of the apparent problems of the other two.

**Level II.** This is an evolved step, growing out of and retaining all of the potentialities of Level I, and is characterized by sensory diversification with organismic abilities to integrate the information from these diverse sources into meaningful unities. These unities, which we can call situations, are, for the organism, his life space for whatever temporal duration the situation, unity, or life space retains a meaningful identity. The duration may be brief or long, depending on many factors. The immediate, in space and time, is the predominant concern of an organism limited to the combined potentialities of Levels I and II.

**Level III.** This is the evolved capacity of the individual to become conscious of the fact of consciousness itself. The potentialities of this level are increased by the twin capacity to delay action while reviewing alternatives for action. In the animal, this delay is brief and often fleeting; in the human being, the delay may be of indefinite extension. Such delay with reflective consciousness is basic to all elaborations of problem solving and communication by means of symbolic representation.

The typical, narrow conception of consciousness — limited to the logical and cognitive, and divorced from action — has been a serious mistake. Most of the blind alleys in the history of the concept of consciousness have been entered because of some variation of this kind of error.

**Conscious-Unconscious: A Figure-Ground Relationship**

With the approach now outlined, a critical step is necessary in the development of a theory of the unconscious. In order to take that step, it must be noted that life in all forms is characterized by a pat-
tern of relative dominance and subordination of functioning segments. When the simple organism is stimulated, the stimulated area tends not only to increase temporarily its metabolic rate, but also to become, at least momentarily, dominant and regulatory. Other functioning segments become background and supportive for the dominant segment. This primitive pattern is seen as the simple beginnings of what is finally called attending or attention. When Level II is reached, the complexities of informational intake from all sources are potentially so great that the relative dominance pattern just described is the only way unity can be maintained. Yet it is important to see that this very pattern requires attending to some aspects of a situation and ignoring to some degree, for the moment, other aspects; thus, some organismic processes become momentarily more facilitated or dominant, while others are suppressed or disregarded and operate in a role supportive to the region of dominance.

The so-called unconscious is assumed to have had its primitive origins in terms of the processes temporarily relegated to background, while other processes were operating at a higher level of dominance. At this stage of development the unconscious is no constant affair, but rather should be described as whatever background of functioning the organism must temporarily subordinate to a supportive role, while in the pursuit or exploration of any particular object. A moment later a different organization may occur with a different cast of dominant and supportive roles for the various processes. If one grants the Level I concept, then the amoeba becomes a good primitive example of a moving or unstable figure-ground relationship. The active pseudopodium at a given moment requires the remaining organism as a supportive background. The figure-ground relationship, while always in transition, is none the less applicable.

In the higher, more complex animals a more consistent "division of labor" or function develops. With increased ranges of motility, internal consistencies must be maintained while varied adaptations to external demands must be met. Range of motility depends directly upon the organism's ability to maintain an internally consistent environment within certain physiological limits, along with the external equipment to move through environments in contrast to the internal one (see 8). Thus, through the development of an autonomic system the organism acquired additional degrees of freedom to move and to deal with more varied and complex types of environments. It is also plausible to assume that the Level I potentialities remained primarily
associated with the processes that maintained internal metabolic consistency — temperature control, circulation, digestion of food, respiration — while Level II was more directly associated with the new and more varied kinds of sensory intake. Even so, organismic integrity is so nicely maintained that description of function in terms of “division of labor” is justifiable only in terms of long phylogenetic perspectives.

For the human being, therefore, it should not be assumed that the functions of the autonomic are irrelevant to or independent of the issues of immediate action. Since the autonomic system is concerned with metabolic processes, tissue regeneration and the like, it is also the segment of the total system wherein the primitive, generalized tissue feeling continues to be generated and still plays a predominant role. Sense of general bodily condition, tissue maintenance needs, and a long gamut of affective responses are contributed by the autonomic. But since also this whole range of activity tends usually to play only a supportive or contributory role in the problems of coping with an external environment, there develops easily the habituated tendency to ignore and disregard many of the facets of experience which arise from autonomic function.

Associated with this naturalistic tendency are the culturally accentuated and value-directed orientations which tend to exclude from public comment and even from private recognition segments of autonomic activity and feeling. Thus, on the basis of both naturalistic and cultural emphases, an unconscious background is enlarged. To this must be added the particular approaches, stylistic of each individual, wherein, due to his own problems, he represses or alienates from himself segments of experience that do not fit the self-image on which he comes to place great value. In the Freudian system this whole background would be called the unconscious, and by both connotation and denotation, acquire conceptually a contrasting and antagonistic role in relation to consciousness. The figure-ground model denies this relationship and insists (a) on continuity and (b) on a supportive role for this bio-psychological background in the typical individual.

Contrasting Theory

It should remain clear, however, that the affective background of experience and behavior is not only the intimate product of the more primitive autonomic system, but also continues to be an instigator and organizer of action.
This emphasis provides the crucial point at which this theory parts company with the Wundt-Titchener structuralistic approach to affective processes. The structuralists were out to discover irreducible mental elements and in the search decided that it was necessary to distinguish carefully between feeling and emotion, and between feeling and sensation, and to determine whether there were other dimensions of feeling besides pleasantness and unpleasantness. There were, of course, many other types of "content" problems, but most of them are now seen as relatively sterile. Such a judgment must necessarily persist as long as the analyses of experience separate consciousness from action in dualistic, anti-holistic approaches.

New meaning and importance are immediately contributed to the old qualities of experience as soon as they are placed in the context of regulatory fields of total organismic action. To see the qualities of experience as only interesting epiphenomena or as a set of "parallel data" to behavior, is to wrest them from meaningful context and destroy the holistic concept of the living organism. It is precisely this latter perspective which has led both psychological theory and experiment into many dead-end projects.

In the light of the present theory of consciousness, it can now be pointed out how easy it was for structuralism to get caught in the trap of its own methodology — a methodology dependent upon Cartesian dualism and the metaphysics of psychophysical parallelism. The approach of Wundt, Titchener and their followers including Magda Arnold and her two-volume recent review (2) is primarily an analysis of mental events when those events are allowed to become encapsulated in the action-delaying potentialities of functional Level III (9). This level, it must be remembered, is associated with the evolved capacity for an indefinite delay of action. Under these circumstances the mental events studied can be viewed "as if" they had no relevance to action and thus, wrested from their essential biological context, the events lose their behavioral meaning.

Because a subject may sit while he tells an experimenter something about his concepts, thoughts, emotions, or feelings, should no longer mislead experimenters and theorists in their interpretation of results. The capacity for delaying action while reviewing potentialities for action, has been taken as a kind of tacit evidence that the potentialities for action and the action itself are two completely separable orders of phenomena. This crucial and traumatic mistake in the history of psychology must be corrected if relevant and ade-
A FIGURE-GROUND MODEL 9

adequately representative experiment and theory are to be developed. The whole field of affective theory and experiment needs reorientation in the context of this broader concept of consciousness in which the biological origins of consciousness are intimately associated with action and integration.

COMPATIBLE FRAMES OF REFERENCE

The theory, as outlined, finds its chief compatibility in the area of Gestalt-holistic-organismic approaches. The figure-ground model borrowed directly from the early perception studies of Gestalt theory (Wertheimer, 23, 24; Koehler, 17; Koffka, 16) and others, seems to have increasing potentiality for describing organismic function. The Gestalt emphasis on the principle of the primacy of the whole over the part has been basic in the development of all phases of holistic theory to which the present theory also contributes.

The closest approximation to the writer's use of the figure-ground model is found in Goldstein who identifies three aspects of behavior as follows: "performances (conscious behavior), attitudes (inner states), and processes (somatic events)" (13, p. 312). While he makes it clear that these are not isolated or separate "spheres of existence," each aspect can assume a role of dominance and become foreground while other aspects function as background. He states also that an aspect in foreground, functions normally only if the others become "an adequate background" (13, p. 313).

The writer's theory differs from Goldstein in that consciousness becomes a more comprehensive or pervasive concept with also a more consistent application of the principle of continuity for the sub-human orders. At the same time Goldstein's emphasis on the role of consciousness, as he conceived it, is of basic importance in behavior. His view is epitomized in the following statement: "Every 'attitude,' every physiological process must be set going by conscious behavior" (13, p. 316).

Other Goldstein emphases that are supportive to the present theory may be summarized as follows: (a) the functional significance of the whole, (b) organismic unity of "body" and "mind," (c) consciousness as the "highest form of coming to terms with the world" (13, p. 334), (d) the inappropriate extension of Freudian concepts to include the normal when they are derived from the disordered.

While the foregoing compatibilities are clear, it must also be indicated that a chief focus or point of reference for the present theory
has been the work of C. M. Child (3, 4) and others in the biological field who have developed the facts and principles of the physiological gradient. This general principle, referred to under several other captions, such as physiological regulation, pattern in development, relative dominance, has itself gone far to confirm the holistic-organismic conception.

**THE FREUDIAN UNCONSCIOUS**

The search for elements, either mentalistic or behavioristic, in a robotistic organism became the context facilitating the acceptance of Freudian unconscious mechanisms. The fundamental misleading error of the Freudian system, which was, therefore, overlooked, was the assumption and description of semi-autonomous mechanisms. To conceptualize the organism as a collection of such semi-autonomous mechanisms is to destroy by implication quite effectively the autonomous individuality of the person. A chief reason for the revolt of Alfred Adler from Freud was that Adler insisted on maintaining the integrated individual rather than fragmenting him into loosely associated mechanisms (1).

Since to Freud there was no person or holistic concept to preserve, it became easy for him to make the great dichotomy or bifurcation between conscious and unconscious a cornerstone of his theory. Freud’s statement of his position is clear: “The division of the psychical into what is conscious and what is unconscious is the fundamental premise of psycho-analysis” (12, p. 13). The basic dichotomy remains in spite of the preconscious concept, since the latter was primarily an antechamber of the conscious and, therefore, essentially a part of the “thin slice of the total mind” (14, p. 52) that supposedly characterized consciousness. Freud recognized, however, that the preconscious concept was unnecessary in the case of feeling. He says specifically, “the distinction between Cs. and Pes. has no meaning where feelings are concerned; the Pes. system was the introduction of ‘connecting links’ for the transmission of unconscious ideas to consciousness” (12, p. 23).

Because of the dynamics of the unconscious the individual was essentially irrational and whatever sense of freedom he had was an illusion. Freud’s key statement of relevance here is: “But these two discoveries—that the life of our sexual instincts cannot be wholly tamed, and that mental processes are in themselves unconscious and only reach the ego and come under its control through incomplete and
A Figure-Ground Model

untrustworthy perceptions—these two discoveries amount to a state-
ment that *the ego is not master in its own house*” (11, p. 143).

In the light of the present approach, the so-called unconscious
should no longer be seen as a vast, mysterious, dark cellar to be lighted
dimly only by psychoanalytical help, but rather as the contributing
and supportive background for any current, consciously directed
activity which has some duration of dominance. The ground or back-
ground includes all the feelings, conative tendencies, and predisposi-
tions that are aroused in some degree by the activity in clearer con-
scious focus and that give that activity the stylistic quality of the
person even though many of the aspects of the background may re-
main unrecognized, elusive, or unverbalized. Some aspects of the
background are always more accessible than other aspects to recogni-
tion and report, but this fact in no way controverts the concept of
essential continuity and unity.

Questions about conflict and dissociation become immediately
relevant. It should be easily recognized that in an organism as com-
plex as the human being some consciously directed activities are going
to arouse background tendencies that are not entirely compatible
with the currently dominant activity. The degree of incompatibility
and the degree of strength of the countertendency can vary widely
within and between individuals. In some instances there may even
be questions as to the locus of relative dominance in regard to an im-
mediate series of actions. The dominance may appear to be in the
background rather than in the areas of clearer conscious focus. This
type of special case becomes a question of degree of integration or
degree to which the individual has abdicated his potentialities for a
self-directed activity and surrendered to a variety of non-self-directed
forms of behavior. Thus, there is no final incongruence between the
present theory and the continuity principle between figure and ground.

Essentially, the issue is one of degree of relative dominance. In
some instances the processes and objective in clear conscious levels
serve and seem to be subordinate to the trends of the less clear levels.
But to assume that this is always true is not only to generalize from a
specially selected sample, the obviously deviant cases, but is also to
misrepresent and distort the image and potentialities of man in the
basic and general sense.

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2 In a forthcoming paper it will be shown that the self is primarily a product
of what has been described as functional Level III.
ACCESSIBILITY AND MODIFIABILITY OF THE GROUND

The issue of this section is extensive because of its dependence on learning theory and its coincidence with theories of psychotherapy. Only brief orientation is possible. The basic principle is as follows: The more adequately organized the individual is, the more the processes in clear consciousness become the dominant or regulatory processes. The maintenance of this relative dominance is dependent upon the ease of accessibility to the clearer conscious levels of any of the background processes that are relevant to an ongoing activity in clear conscious focus. Thus, in simplified form, the route to disorganization and disintegration is rejection, alienation, and repression of aspects of experience and self that are stressful or unacceptable (see 6). On the other hand, readiness to accept and deal realistically with whatever aspects of experience are of importance to one, no matter how difficult, is one of the basic principles in maintaining personal integration, mental health and the fostering of growth toward more adequate individuality.

These principles rest directly upon what seems to be a basic psychological principle, namely, that processes in clear conscious focus have increased chances of modifiability on the basis of field interaction with other processes in that field. The converse is that processes in the unclear background that remain inaccessible to clear consciousness have less opportunities for modification. Freud gave partial recognition to this fact when he stated that trends and ideas repressed into the id became timeless, that is, time was not associated with changes in these tendencies.

Transition of processes from less conscious to more conscious levels has been said by some to be attended with increased effectiveness of the processes upon behavior. Increase of effectiveness may result if the process is recognized as compatible with a dominant goal, or decrease in effectiveness may result if incompatibility with dominant processes is recognized. In many instances for a process to come into clear consciousness is to result in neutralizing its effects. The point is that such transition provides opportunity for the person, himself, to manage the issue with more consistency in terms of the self-image he values.

INSTINCT THEORY AND THE SO-CALLED UNCONSCIOUS

Instinct theory, like many theories in psychology, has suffered both from too much association with a mysterious unconscious and from an overinvestment in the mechanistic. Both mechanism and
unconsciousness have been terms conveniently used to cover ignorance by apparent sophistication, although the former has more easily invited some kind of experimental effort. But the mechanism was often studied without considering the context of the organism and its adaptive capacity to a situation.

Watson urged, “We should define instinct as an hereditary pattern reaction . . . as a combination of explicit congenital responses unfolding serially under appropriate stimulation” (22, pp. 252-253). Watson successfully led a growing parade of followers who not only emphasized the serial mechanical sequence of patterned movements but also excluded the conscious experience aspect.

From a kind of intellectual wilderness, McDougall raised his voice in vain pointing out that this approach was misleading. He said, “for, if we neglect the psychical aspect of instinctive processes, it is impossible to understand the part played by instincts in the development of the human mind . . . .” (19, p. 31).

While the recent review of Ronald Fletcher (10) may not satisfy some people, his key statements place the instinct concept clearly in the writer’s Level I supportive background. “Instinctive behavior essentially comprises, among other things, a craving, a persistently recurring impulse, which is closely correlated with direction, the persistence, and the unity of a certain sequence of actions. In such instinctive activity the whole organism is involved” (10, p. 80). He continues, “Furthermore—and this must be emphasized repeatedly—the feature of instinct which was held to be of the greatest importance in man was not the behavioural feature, but the ‘conative-affective’ core of the instinct; the ‘craving’ or persistently recurring impulse” (10, p. 91).

The history of the vicissitudes of the concept of instinct are too well known to repeat, but the Gestalt group were not slow to point out the defect in behavioristic theory in understanding how the sequence of behavioral “elements” ever got put together, or held together, under varying adaptive requirements, or how the so-called “elements” became so modified in the adaptive process as to lose their identity without destroying the general pattern. And if McDougall’s “psychical” or “mind” terms can, in a broad-minded way, be momentarily substituted for the writer’s concept of a three-level functional consciousness, agreement with both McDougall and Fletcher becomes obvious and necessary.

The present theory of a functional three-level consciousness appears to give the instinct concept perspective within its total context.
The instinctive tendency is seen as primarily a product of the affective-conative-predispositional background of the organism which in turn is a product of or dependent upon the functional qualities of protoplasm common to an animal species.

The writer agrees, generally, with Pieron’s statement, “The domain of affectivity is essentially that of controlling tendencies operating at the level of the regulation of general behavior, just as they already operate at the level of organic regulation” (21, p. 80). However, Pieron tends to think only in terms of nervous system and its connections, while the writer’s approach includes the feeling potentialities of all bodily tissues, the nervous system being the set of cells more specialized for conductivity.

The concept here is broader than nervous system—which has almost come to assume the role of another soul in modern psychology. The feeling potentialities of an organism are Level I products contributed by protoplasmic qualities of a total organism. These feelings, which are usually generalized, integrate and organize action and are basic to the varying thresholds of sensory and attentional response. When such a pattern of feeling tends to arise at a particular age, or to recur periodically or to appear under particular circumstances with common characteristics of response patterns, it has been labelled an instinct. Thus, the instinctual pattern is a special form of the generalized feeling background of living protoplasm with a characteristic behavioral expression. These feeling potentialities shade from the more constant or predictable to the less constant and more variable. Hence, the historical attempts at classification would necessarily result, as they did, in disputes without stable conclusions.

By the theoretical perspective represented, the following integrative approaches are accomplished: (a) The instinctive aspect of behavior becomes primarily a functional part of an organismic segment (Level I) wherein the context gives a broader meaning to the concept. (b) The instinct concept is rescued from the traditionally semi-mysterious realm of a so-called unconscious and made a part of the supportive ground in organismic function. (c) Continuity is indicated between the instinctive trend and other less stable feeling-conative aspects of organismic regulation.

THE COLLECTIVE UNCONSCIOUS

Almost more than any other writer, C. G. Jung has added to the mystery and mysticism of the so-called unconscious. To the personal unconscious of general and Freudian conceptualization, Jung has
added a collective unconscious which he claims is not developed out of individual experience but which is inherited, and consists of archetypes or specific forms of unconscious racial predispositions. Jung suggests that "the archetypes are the unconscious images of the instincts themselves" (15, p. 44). Although too simplified, it is an approximation to the point to say that the Jungian archetypes are the varied symbolic, creative expressions that may be found to have common hidden meanings for human beings.

Whatever is valid in Jung's theory will be found primarily as products of Level I, translated into symbolic form for communication through one of the sense modalities. Typically the symbols are visual patterns, pictorial or ritualistic; or auditory patterns of music, rhythms, fables, or descriptions. Meanings are connotative, suggested and "caught" by educated sensitivities. In such a context mystical explanation is easy and satisfying.

In the context of the present theory the following may be stated: (a) All of what Jung has said may be reinterpreted to correspond to the writer's position that the potentialities and complexities of functional Level I are immense; systematic study of this aspect of the human protoplasm can be expected to show common racial characteristics and at times similar symbolic expressions or translations from one ethnic or cultural group to another; but nothing mysterious need be accorded this fact. (b) Rather greater respect is required for the complexities of the potentialities of human affective-predispositional background, much of which goes unverbalized and therefore poorly recognized or even avoided or rejected. (c) For some kinds of exploration of Level I, a temporary denial or reduction of the potentialities of Level III is required, but this does not necessarily invest the resulting experiences, art forms, ecstasies and selfless oceanic qualities with a mysterious racial unconscience that is separate from the total supportive background of affective-organismic function. (d) Once the continuity has been conceptually established between the conscious and so-called unconscious by the figure-ground model, the aspects of behavior conceptualized by Freud and Jung become more obviously available for experimental investigation than was formerly assumed.

Summary

The functional three-level theory of consciousness developed in earlier papers is offered as a context within which a figure-ground model replaces the traditional conscious-unconscious dichotomy. The ground aspect is identified with the affective-conative-predispo-
sitional characteristics of functional Level I. This ground, or background, is seen as continuous with and typically supportive to a more dominant set of processes that for a time operate at the clearer focus or field of consciousness. The so-called unconscious is not necessarily discontinuous with consciousness, nor necessarily in conflict with consciousness, nor perpetually mysterious. The model offered provides a larger frame of reference that maintains a holistic view of the organism and should give improved systematic meaning to concepts related to the traditional unconscious. Illustrative discussion was offered of the concepts of instinct and “collective unconscious.” Extension of the approach seems feasible but must wait for later papers.

References