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A STRUCTURAL INTEGRATION OF PSYCHOANALYTIC AND PIAGETIAN THEORY

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A STRUCTURAL INTEGRATION

OF PSYCHOANALYTIC AND PIAGETIAN THEORY

by

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Abstract

A STRUCTURAL INTEGRATION
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by
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This dissertation attempted an analysis and integration of psychoanalytic and Piagetian theories. After some preliminary analysis of theories it was felt that the integration of theories would be most facilitated by the selection of a particular definition, out of a number of possible definitions, of psychoanalysis. At this point the scope of the dissertation was more clearly defined to encompass only psychoanalytic motivational concepts and the Piagetian concepts of equilibration, organization, adaptation, assimilation and accommodation as these latter concepts are explained by Piaget in the Origins of Intelligence. The psychoanalytic model of motivation which seemed to this author, most compatible with Piagetian theory, was an information feedback model developed by George Klein.

A summary and discussion of Klein's model was presented. Some modifications of that model were proposed. A summary and discussion of The Origins of Intelligence followed.

Finally a model which incorporated Piagetian concepts and psychoanalytic motivational concepts was presented. In this model the cyclical aspect of instinctual motives is explained by the hypotheses that motives emerge, and are satisfied or frustrated, in cycles which are constituted as successive and varying patterns of interrelationships of elements in organization lead sequentially to one another. In this model, too, it is assumed that intensity and quality of motivation, vary with the progression of events in these cycles. It is the variations which occur with the progression of the cycle, which make it seem that motives are autonomous or self-generating. In this model pleasure is associated with the correction of imbalance or with the transition from disequilibrium to equilibrium and unpleasure with the emergence of imbalance or the transition from equilibrium to disequilibrium. Quality of affect is determined by the specifics of the

reordering which occurs with the transition from equilibrium to disequilibrium and vice versa, and intensity by the comprehensiveness of the interrelationships involved in the reordering.

Motives, then, are experienced as emerging and subsiding and reemerging again as shifts in locus and definition of disequilibrium occur with the progression of events in the cycle. Depending on the specificity and the comprehensiveness of the cycle, different motives or different forms of the same motive emerge as quality and intensity of affect vary.

Motivational hierarchy varies then as sequences of events are activated and terminated and reactivated in the context of their relationships to other sequences of events.

It is assumed, finally, that the primacy of sexual or erotogenic motives is due to their centrality. The centrality of these motives, it is assumed, is due, first of all, to the characteristics of the networks of elements which give rise to them.

It is assumed that these networks are richly supplied with pathways linking its elements to the elements of other networks. It is also assumed that, in the immature organism, the centrality of erotogenic motives, is due to the relative order of the schemata comprising them.

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CHAPTER I

PROPOSAL FOR A STRUCTURAL INTEGRATION OF PSYCHOANALYSIS AND PIAGET

I have been interested, for some time, in an integration of psychoanalytic and cognitive theories, in particular those cognitive theories propounded by Piaget.

Both psychoanalytic and Piagetian writings have stimulated thinking and fostered research in varied fields of inquiry. Thus, psychoanalysis, besides encouraging studies of normal child development within a psychoanalytic framework, has raised questions for students of literature, art, religion and politics. Piaget, through his own epistemological studies and his encouragement of the epostemological studies of others, has attempted to find correspondences between the development of logical thinking in children and the development of science. This has, in turn, aroused interest in the implications of his work for educational interventions, both in western and nonwestern societies. While

hypotheses generated by either of these theoretical systems may not have been undisputedly accepted, the current work acknowledges the value of these systems, and has, as its purpose, not the investigation of the concordance of hypotheses with empirical observation but rather the investigation, and, if possible the coordination of the logical structures of these theoretical systems.

This attempt has been motivated by the apparent, but yet to be thoroughly systematized, interaction of cognitive and affective development. While it is generally accepted that cognitive and affective processes are not unrelated, an adequate theory of their interdependence has not yet been proffered. Thus, psychoanalytic theory, in its distinction between primary and secondary processes and between primarily and secondarily autonomous functions of the ego, has recognized, but not fully explained, the importance of cognitive activity for emotional development. Similarly, the connection between disordered emotional states and disordered thinking is acknowledged but incompletely comprehended, and, in like manner, the significance of emotional experience for the creative processes is appreciated but not entirely understood. It is hoped, then, that this work will make

some contribution towards a theory of cognitive-affective interaction. A study of psychoanalytic thinkers and Piaget is here considered most likely to facilitate the development of an integrated cognitive-affective theory.

Each of the systems to be involved in this integrated theory has arisen from attempts to explain events in a particular empirical domain. A basic assumption of this work is that theoretical systems are often valuable in fields other than the one in which they were originally used as explanation and that it may be especially promising to consider the value of a theory in explaining events described by another when the theories considered have such apparently intersecting empirical domains as do cognitive and affective theories. In addition, the way in which one theory contributes to the development of another is considered to depend upon the particular aspect of the theory utilized in the transposition from one system to another. It will be helpful to here refer to Ernest Nagel (1961) who distinguished three components, or aspects, of theories, whose translation from one theoretical system to the other may have differing consequences for the theories involved.

Nagel (1961), first of all differentiates between the logical and nonlogical terms of a theory. Thus, a theory contains "logical particles such as 'if-then' and 'every' (p.91) which belong to the vocabulary of formal logic and "nonlogical expressions" (p.91) which have associated with them "various more or less visualizable notions" (p.91) and which are "specific to discourse about some special subject matter" (p.91). Nagel goes on to say, however, that the "nonlogical terms of a theory can always be dissociated" (p.91) from the "concepts and images" (p.91) associated with them. Then "attention is directed exclusively to the logical relations in which the terms stand to one another" (p.91). "When this is done," he says, "the fundamental assumptions of the theory formulate nothing but an abstract relational structure" (p.91). He goes on,

> "in this perspective...the fundamental assumptions of the theory constitute a set of abstract or uninterpreted postulates, whose constituent nonlogical terms have no meanings other than those accruing to them by virtue of their place in the postulates, so that the basic terms of the theory are only 'implicitly defined' by the postulates of the theory...a fully articulated scientific theory has embedded in it an abstract calculus that constitutes the skeletal structure of the theory" (p.91).

This abstract calculus Nagel describes as constituting one of the major components of a theory.

Nagel goes on to say that without something further added to this abstract calculus a theory "is scientifically useless" (p.93). He says that it is necessary to indicate how the implicitly defined nonlogical terms discussed above "are related to ideas occurring in experimental laws" (p.93). Rules of correspondence (p.97), another major component of theories, provide linkages between the abstract uninterpreted nonlogical terms and "observable materials" (p.93).

Finally Nagel discusses the "model" (p.95) in which the theory is presented as a major component of a theory. The model provides an interpretation for the theory, in terms of "relatively familar notions" (p.95). The abstract, uninterpreted nonlogical terms of the abstract calculus thus receive some interpretation. However, despite their interpretation by way of the "model" this interpretation is not considered fundamental to the theory. As Nagel says "...a theory may receive alternative interpretations by way of different models; and the models may differ not only in the subject matter from which they are drawn but also in important structural properties" (p.97). Furthermore, Nagel says "...models

are not substitutes for rules of correspondence" (p.97) and "...though a theory is presented in terms of a model, it by no means follows that the theory is automatically linked to experimental concepts and observational procedures" (p.97).

To recapitulate, a theory includes, according to Nagel, an abstract relational structure, rules by which the structure is related to experimental laws and observational procedures, and a model which presents the abstract structure in a visualizable or familiar form. Thus, the results of an integrated attempt will differ, depending upon the aspect of theory integrated. To be more specific:

1. A theory may be supplied with new rules of correspondence linking the abstract calculus to a new empirical domain. This does not necessarily imply a change in the fundamental propositions of the theory, though it may suggest such changes.
2. The set of propositions of a theory may be altered. they may be added to, restricted or made a subset of some more inclusive set of propositions.

3. The model by which the theory is presented may be changed. The change in model, as can be determined from its definition above is insignificant in and of itself, supplying as it does only one of many possible interpretations for the abstract postulates themselves. However different models may illustrate different aspects of the abstract calculus and features of the calculus neglected in one model may be articulated in another. Thus a change in model may also, but does not necessarily imply a change in the abstract postulates.

A way of evaluating the success of an effort at integration, including the present effort, then, would be to see to what extent the above enumerated modifications in the theoretical systems have taken place.

An integration of the nature intended presupposes, of course, a rather careful comparative study of the individual theories to be included in the integrative effort and an examination of currently available attempts made towards such an integration.

Evaluation of integrative attempts may be made, as suggested, by way of the criteria specified above. The comparative study of the theories of psychoanalysis and Piaget may also be facilitated by distinguishing between the model, abstract calculus and rules of correspondence of each system. It will then be possible to examine the degree of congruity or incongruity between theories, in their present form, according to the theoretical level addressed.

Thus we can see that if theoretical systems are found incongruous on the basis of the models employed for presenting those systems we may be faced with a surface incongruity which disappears when the underlying abstract relational structure of the theory is discerned. Similarly, different schools of thought may have, associated with their systems, rules of correspondence which link their theoretical terms with different empirical domains. Again, the underlying systems of relations (abstract calculi) proposed by the theories may or may not be different, and, if different, may or may not be congruent with one another. However

when the abstract relational structures described by the theories are found to be different, this difference is not to be considered inconsequential. We must, in this case, distinguish between competing and complementary theoretical systems. We may find competing systems where different explanations are proposed for the relations observed in the same empirical domains. Complementary systems might offer different explanations for different empirical domains. The systems, in this latter case, would thus not be contradictory.

More simply, we may ask: Do the theories attempt to explain the same phenomena? Are the same phenomena explained similarly or differently by different theories? To what extent are different phenomena explained similarly, and, to what extent are the metaphors by which the explanations are offered similar or dissimilar? This last question includes implicitly the question of whether the systems employ the same or different languages, since differences in language generally imply a difference in metaphor.

Neither the analysis and comparison of theories outlined above nor the evaluation of current integrative attempts will necessarily lead to the desired integration of theories. Rather these are preliminary steps which aim at clarification of the existing relationship between cognitive and affective theories. Moreover, it is not to be expected that the various components described by Nagel will always be easily distinguishable in the process of analysis. Nagel himself suggests that it may be difficult to separate the essentials of the abstract relational structure from the model employed in presenting it or to formulate the specific rules of correspondence used in the theory.

Thus, while I would consider the analysis and comparison of theories according to these components a valuable heuristic procedure, it is nevertheless, not necessary that it be possible to abstract a completely defined propositional system from each theory included, or, that the theories, in their entirety be completely congruous with each other, in order for the work of integration to proceed. Thus it may be that the

boundaries by which any particular system is delimited preclude its complete systematization in an internally consistent set of principles. The phenomena selected for explanation in a particular system may not be so explainable without reference to other empirical domains not considered within the system. Restriction of the system to that domain, while perhaps initially necessary may inhibit the formation of a more exhaustive and complete theoretical system. Similarly, the model by which a theory is presented may illustrate, as mentioned earlier, some aspects of an abstract calculus and neglect other aspects.

Thus the theory's interpretation by way of a particular model or models may prevent the articulation of some important relationships not evident in that particular model. It is crucial to the task of integration of theories to remember that a model presents only one of many possible interpretations of a theory. It is suggested, moreover, that the models themselves may be interpreted differently depending upon the empirical context to which they are related. Even relationships

seemingly well defined in a particular model may be considered differently in a different empirical context. Different features of a model may also become more or less significant depending upon the context in which the model is embedded. Furthermore, a particular model may employ certain restrictive assumptions not germane to a more inclusive theory or it may suggest ways by which an existing set of propositions may be expanded or added to which had not been evident in another model.

In this work, then, for purposes of lessening some theoretical limitations inherent to individual systems, the boundaries of theory will be defined to include the different empirical domains of cognition and affect and several different models by which explanations of these domains are offered. By considering the varieties of ways by which the model itself could be interpreted within the context of its combination with other models and empirical domains than that in which it had originated, it is hoped that an interpretation could be arrived at by which both processes of cognition and affect could be expressed and from which a coherent

system of propositions could be abstracted. The full development of a cognitive-affective theory awaits the delineation of this system of propositions, which, in effect, constitutes the internal boundaries of the theoretical system. The theoretical boundaries I referred to above, which are not equivalent to these internal boundaries, are, of necessity, preliminary, superficial and determined to some extent, by the interests and intuitions of the theoretician rather than the internal necessities of a theory. The kind of preliminary boundaries I have suggested, are, of course, necessary to the theoretician, in order to make the task ahead feasible. However, the actually articulated theory may not be delimited by exactly those boundaries. Rather it is delimited by internal boundaries constituted by the set of abstract postulates to be discerned, and, by external boundaries constituted by the empirical conditions to which it is possible to apply those postulates as explanatory. Thus it is conceivable that the task of construction of an integrated cognitive-affective theory of development may not be accomplished

within the provisional boundaries I have provided for myself. These preliminary boundaries themselves may prove to be limiting, inexact and/or misplaced. If it is not possible, within these boundaries, to arrive at an interpretation fitting to both the affective and cognitive and cognitive systems I will study, I will account, as well as I can, for this impossibility and hope that the analysis and comparison of systems, mentioned earlier, will be helpful to others interested in a cognitive-affective integration.

I must, at this point, specify more clearly the actual limitations I will impose upon the task being considered. Both Piagetian and psychoanalytic thinkers have produced an extensive collection of writings and it would be impossible to consider, even superficially, all of the relevant literature. Thus I will restrict myself to begin with, to integrating those writings which discuss a particular period in development, starting with birth and ending with the anal period. From the writings about this period, moreover, I will select only some authors, whose work I think will be particularly helpful in the integration of theories.

In addition, I will choose some writers, not so much for their particular emphasis on the developmental period I have specified, but rather for their study of the structure of the theory itself. Finally, I will select authors in whose work there has been an attempt to integrate Piagetian and psychoanalytic thinking.

I will now present a selection of authors whose works I consider important to the integrative effort. It is quite possible that even the study of this limited group of authors is not practicable within a dissertation effort. Thus I have also suggested some points, within this study, at which it would be possible to consider the dissertation completed.

The authors I have selected and the reasons for their selection are:

1. Piaget (1952), chosen for his studies of early cognitive development.
2. Hartmann (1958, 1964, and with Kris and Lowenstein, 1964)chosen both for his consideration of development and his contribution to the structure of psychoanalytic theory.
3. Spitz (1965), chosen for his developmental studies.

4. Mahler (1968b and with Pine and Bergman, 1975), chosen for her developmental studies.
5. Melanie Klein (1975), chosen because her object relations point of view introduced significant variations in psychoanalytic theory, particularly as related to early development.
6. Wolff (1960, 1963, 1967), Cobliner (1967), Decarie (1965), Schackelford (1976), chosen for their attempts to integrate psychoanalytic and Piagetian thinking.

A full attempt at a cognitive-affective integration, must consider, I believe, previous efforts to integrate psychoanalytic and Piagetian thinking. One way, then, to approach the completion of this dissertation is to include as necessary to it the study of the works of Wolff, Cobliner, Decarie, Mcloughlin and Shackelford. This work should also include, of course, the writings of Piaget, particularly those writings which pertain to the period of life beginning with birth and which ends coinciding with the end of the anal period. In addition to Piaget's works and the works which

attempt to integrate Piaget and psychoanalysis I suggest that the dissertation necessarily include a comparative study of one of the following:

1. Hartmann (1958, 1964 and with Kris and Loewenstein, 1964)
2. Spitz (1965, Mahler (1968b and with Pine and Bergman, 1975)
3. Melanie Klein (1975)
4. Rapaport (1951b, 1959)

Alternatively I may wish to begin the integration with a systematic study of psychoanalytic thinking itself. In this case I suggest that this dissertation be considered completed when I have explicated the structure and consistencies and inconsistencies within the developmental writings of any one of the following authors or groups of authors:

1. Hartmann (1958, 1964 and with Kris and Loewenstein, 1964)
2. Hartmann, Spitz (1965), Mahler (1968b and with Pine and Bergman, 1975)
3. Hartmann, Rapaport (1951b, 1959)

4. Hartmann, Klein (1975)

5. Rapaport (1951b, 1959), Spitz (1965), Mahler (1968b and with Pine and Bergman, 1975)

This alternative is suggested in view of the complexity of the works involved and the knowledge that the elucidation of these works so necessary to an integrated theory is, in and of itself a considerable task.

I would like to call attention to the fact that, in neither alternative offered, do I suggest that the actual presentation of a unified cognitive-affective theory be necessary to the completion of the dissertation. While the development of such a theory is a goal of this work it is an ideal goal and I will be content to have made a contribution toward its eventual achievement.

It will be useful to here summarize the goals of this thesis and the working methods by which I hope to achieve these goals. I would hope, ideally, to be able to articulate a unitary cognitive/affective theory of development. However, given that this articulation

may not be possible within the limits of a dissertation, I would like to either make some significant contribution towards this end and/or to clarify somewhat the difficulties which stand in the way of such an articulation. It seems to me now, that the theoretical integration of Piagetian and psychoanalytic developmental systems will be most likely to facilitate such an integration. Thus, I have chosen, firstly, to examine these theories carefully, differentiating between the essentials of the theoretical structure, the form in which the structure is presented and the relationship of the structure to empirically verifiable events. I will be most concerned, in this regard, with the congruities or incongruities between the essentials of the theoretical structures examined rather than with the form in which the structure is presented or the relationship of the structure to empirical observation. I envision that this thesis will generate testable hypotheses rather than examine in depth the actual relations of these hypotheses to reality. Therefore

I will interpret the models by which the systems are presented in a variety of ways, depending upon the empirical context and other models considered, hoping thereby to find an interpretation consistent with both psychoanalytic and Piagetian thinking.

CHAPTER II

REVIEW OF LITERATURE

I suggested in my proposal that I would attempt to analyze the theories of Piaget and psychoanalysis according to the notions of theory proferred by Ernest Nagel (1961). I suggested that, through an analysis of each theoretical system, I would be able to discern, and then to present, the model, the rules of correspondence and the abstract calculus of each theory.

I was working toward the development of a theory in which psychoanalytic and Piagetian concepts could be integrated.

I began with an attempt to determine the model, rules of correspondence and abstract calculus of psychoanalytic theory. I discovered this was a formidable and probably impossible task.

Psychoanalysis is not a unified internally consistent theory. Its essential concepts frequently have multiple definitions, not all of which are in accordance with one another. It became clear that the analysis of theory could not occur apart from its construction, insofar as that analysis involved deciding that certain definitions of terms rather than others conveyed their true or essential meanings.

It is true that I could have taken an historical approach and studied the changing definitions of selected terms, as these definitions changed in the course of development of psychoanalytic theory. While this would have been valuable it would have meant putting aside the attempt to integrate psychoanalytic and Piagetian thinking.

In light of my original goal, then, my working emphasis shifted from the task of analysis of theory to theory construction. In order to effect this shift, I limited not only my study of Piagetian and psychoanalytic thinking but also my analysis of attempts made to integrate these theories. I gave up the attempt to determine the models, rules of correspondence and the

systems of abstract calculus for the theories of psychoanalysis and Piaget. I also narrowed the range of theoretical material I would examine, giving up the attempt to present a detailed analysis of Hartmann or of Rapaport and giving up the attempt also to present a detailed analysis of Melanie Klein, Spitz, or Mahler. I took instead, as particular focuses the psychoanalytic theory of motivation, the Piagetian concepts of organization, adaptation and equilibration and Peter Wolff's efforts to bring together psychoanalytic's motivational and Piagetian developmental concepts.

I attempted then to interpret Piagetian developmental concepts in the light of psychoanalytic motivational concepts and to interpret psychoanalytic motivational concepts in the light of Piagetian developmental ones.

While analysis of theory has played a very important role in this work, my final presentation will reflect the shift in my emphasis from analysis of theory to theory construction.

As a basis for this constructive integration of psychoanalytic and Piagetian thinking I have relied not on traditional formulations of psychoanalytic motivational concepts but on formulations of these concepts cast in the language of an alternative psychoanalytic motivational model. This alternative model is an informational feedback model developed by George Klein (1967).

My reasons for selecting a nontraditional psychoanalytic model of motivation are twofold. First of all, psychoanalytic theoreticians have become increasingly critical of motivational concepts formulated in the traditional terms of the energic model. Secondly, Peter Wolff found it difficult to integrate convincingly psychoanalytic motivational concepts formulated in energic terms and Piagetian developmental concepts.

In the remainder of this chapter I will discuss, first of all, some of Wolff's attempts at integrating the two theories and, secondly, some of the criticisms of the energic model. Because this dissertation will deal principally with the foundations

of Piaget's theoretical system, as elaborated by him in his discussion of the sensorimotor period. Peter Wolff's analysis of Piaget's sensorimotor theory is of particular importance for this endeavor.

Peter Wolff

Following a detailed comparison of psychoanalytic and Piagetian thinking in Developmental Psychologies of Jean Piaget and Psychoanalysis, Peter Wolff (1960) came to the conclusion that there were two different kinds of motivation.

Thus he says

> I will assume that all behavior at all stages of development is codetermined by two kinds of motivation - the 'long-range' and 'short-range' forces...The 'long-range' forces correspond to the instinctual drives of psychoanalysis or the organic needs of sensorimotor theory. They arise from physiological imbalances and have an inborn coordination to specific objects in the environment which alone can correct the somatic imbalance...The 'short-range' forces correspond to a need to function or ego interests. They arise from disequilibria of adaptive mental structures, are unrelated to the body's organic state but very much related to the adaptive interaction between the individual and reality. These forces have no inherent coordination to external objects, although at first they are directed to certain classes of objects which represent 'stimulus nutriment' for them. (p.57)

In a later article, entitled "Developmental and Motivational Concepts in Piaget's Sensorimotor Theory" Wolff (163) concluded that Piaget's theory contained no true motivational concept. Following Rapaport (1960), Wolff (1963), distinguished between motives and causes of behavior and concluded that Piaget's 'need to function' was a cause of behavior but not a motive.

In yet a third article, entitled "Cognitive Considerations for a Psychoanalytic Theory of Language Acquisition", Wolff (1967) likened Piaget's sensorimotor schemata to Erikson's organ modes, concluding that the direction of motivation is a function of the action patterns through which instinctual energy operates. However, following Erikson, Wolff continues to consider intensity of motivation a function of energic quantity. Thus, he attributes direction but not impetus of behavior to the 'need to function' or sensorimotor schema.

Wolff is thus, unable to articulate a view of motivation which fully integrates psychoanalytic motivational concepts and Piagetian developmental concepts.

In "Cognitive Considerations for a Psychoanalytic Theory of Language Acquisition" (Wolff, 1967) the question of behavioral impetus is not satisfactorily addressed. In this article Wolff distinguishes between action patterns and the energy those action patterns use. However Wolff does not clearly define the relationship of psychic energy to these action patterns. Neither does he clearly specify if, and how, psychic energy is coordinated with the need to function, which, according to Piaget characterizes these action patterns.

In Developmental and Motivational Concepts in Piaget's Sensorimotor Theory of Intelligence Wolff (1963) does not address the relationship between causes of behavior and motivation.

Finally, in Developmental Psychologies of Jean Piaget and Psychoanalysis, Wolff (1960) does not make clear the relationship, if any, between physiological disequilibrium, which he associates with instinctual activities, and mental disequilibrium, which he associates with ego activities. Thus, he

seems to assume, perhaps unwittingly, that there is a discontinuity between the organic and the mental.

Infrequently Wolff's difficulties in integrating the two theories are based on questionable interpretations of Piaget's work. For the most part, Wolff's inability to fully integrate the two theories is based on his reliance on traditional formulations of psychoanalytic motivational concepts.

Wolff's reliance on the energic model and his occasional misinterpretations of Piaget's work results in an exaggeration of the differences between the two theories rather than in a resolution of those difficulties.

Thus in the fifth chapter of his monograph Wolff (1960) says,

> Both theories assume that internal as well as external stimulations play a role in development, but they assign different degrees of importance to the stimuli arising from these two sources as motivation for action. (p.57)

He goes on to say,

> Sensorimotor theory deals almost exclusively with external stimulation, and assigns only a transient role to the organic stimuli. The accidental impingement of stimuli on the organism, and the tendency to organize the effects of these

> stimuli, together create a 'desirability' or need to function which sets the reflex or acquired behavior into motion, as the behavior is gradually adapted to the stimulus, new external stimuli impinging on the periphery create new needs to function. (p.57)

He also says,

> In classic psychoanalytic theory instinctual drives were considered as the primary sources of stimulation and a subsidiary role was assigned to external stimuli. The accumulation of instinctual tension arising from the somatic apparatus is the primary cause of all behavior... (p.57)

It is a question of interpretation but I think that here Wolff overemphasizes the role of external stimuli in the theory of Piaget. Piaget not only recognizes the influence of internal stimuli on action. He also emphasizes that the "need to function" may be set into motion by the very functioning of the organism, that is, the influence of action on the continuation of action. Thus Piaget (1952) says,

> But to these definite excitations connected with particular moments in the life of the organism, there is added, it seems to us, the essential circumstance that the very repetition of the reflex movements constitutes a cynamogeny* for them. (p.32)

*Cynamogeny here refers to the idea that it is through movement that movement continues.

Again it is a question of interpretation, but I think that in emphasizing the significance of internal stimuli in psychoanalytic theory Wolff overlooks the ambiguity that exists even in classical theory about the relationship between stimulation and energy and drive.

In any case contemporary psychoanalysis recognizes the role of external as well as internal stimulation in motivation.

Wolff (1960) continues his comparison of the two theories. He suggests that the two theories postulate different responses to external stimuli.

> The organism's fundamental tendency is to assimilate external data to itself according to sensorimotor theory, and to rid itself of all stimulations, according to psychoanalytic theory. (p.60)

My only comment here is that even Freud questioned his own formulations of the pleasure principle. The statement by Wolff which I have quoted above does not reflect in any way the confusion or uncertainty of psychoanalytic theoreticians about Freud's assumption that the organism acts to rid itself of all tension.

Finally Wolff (1960) distinguishes between the place of structure in Piaget's theory and the place of structure in psychoanalytic theory. He says

> The concept of motivation in sensorimotor theory is inextricably tied to its structural conception; classic psychoanalytic theory postulated a set of drive motivations which are originally independent from the structures to which they are related. (p.62)

I have no quarrel with this observation. I nevertheless want to emphasize that Wolff refers to classical rather than contemporary psychoanalysis theory.

Wolff,(1960)in summarizing this chapter, suggests that differences between the theories could be resolved in one of three ways. It is worth reviewing these alternative formulations.

Wolff (1960) suggests that,

> It could be assumed, with classical psychoanalytic theory, that instinctual drives are the basic motivations, and that drives and drive-controlling structures are the only significant developmental factors. (p.63)

Alternatively,

> It could be assumed, with Piaget's theory, that psychological schemata and their disequilibria are the core factors of development. In this conception organic-need-motivated behaviors (which are the basic motivations of psychoanalytic theory) are determined by the disequilibria of biological schemata. It would follow that the psychological processes retrospectively reconstructed and explained as drive-motivated behaviors by psychoanalysis result from complex assemblies of organic and functional schemata in various combinations...Drive motivations would be accounted for as disequilibria of biological structures coordinated with sensorimotor schemata and giving rise to complex and highly stable 'desirabilities'. (p.63-64)

Yet a third alternative exists.

> It could be assumed that the absolute dichotomy between external and internal stimulation as the source of motivation is not necessary to either theory; that neither drive motivation nor the need to function is the exclusive determinant of behavior, and that one concept of motivation is not simply reducible to the other since organic need (instinct) and desirability operate according to different developmental laws...The developmental process as outlined by sensorimotor theory may then be assumed to refer to behavior patterns which are activated when organic needs are not pressing and when the infant is in a condition to respond optimally to external stimuli, and in a condition to elaborate reality-adaptive structures. (p.64)

Wolff (1960) does not state in this chapter which alternative seems to him more convincing than the other. However in his conclusion that there are two different kinds of motivation, he seems to favor

the third alternative. Wolff's second alternative is, I think, more compelling and the formulation of motivational concepts I will later present is most akin to it.

Wolff's representation of psychoanalytic theory in "Developmental and Motivational Concepts in Piaget's Sensorimotor Theory" (Wolff, 1963) also results in an exaggeration of differences between the psychoanalytic theory and Piaget's theory rather than in a resolution of those differences.

Thus Wolff (1963) quotes Rapaport who states that,

> "motives are appetitive internal forces...the defining characteristics of the concept of appetitiveness as I am using it here are the following: (a) peremptoriness, (b) cyclic character, (c) selectiveness, and (d) displaceability. (1960,p.187)" (Wolff, p.226)

Wolff (1963) suggests that "the need to function is the exclusive concept of causation in sensorimotor theory." (p.226)

Wolff (1963) states, in explanation of the 'need to function'

> We have seen that as long as an action is not adapted, each repetition slightly alters the behavior pattern; from this we inferred that assimilation and accommodation had not

> completed their adaptive work. Until the repetition of an act no longer changes behavior, the corresponding schema is said to be in a state of disequilibrium, or the action pattern is said to be a state of disadaptation. The theory assumes that disequilibrium (at the level of mental constructs) or disadaptation (at the level of behavioral descriptions) gives rise to a need to function, or a need to repeat action to the point of adaptation. (p.231)

Wolff (1963) suggested, then, that the Piagetian concept of 'need to function' differed from the psychoanalytic concept of motivation, as represented by Rapaport in several ways.

First of all, Wolff (1963) said that motives, in psychoanalytic theory are conceived of as internal forces. Wolff (1963) contrasts this with the need to function which is "neither generated within the organism nor imposed on the organism as an external force." (p.232) It is important to note here that in more current psychoanalytic thinking, motives are no longer thought of as internal forces.

Wolff (1963) goes on to suggest that, unlike motivation, the need to function is not cyclical. Neither, he stated, is it peremptory. Wolff's suggestion, that the need to function is neither peremptory nor cyclical, can be challenged.

Sensorimotor action patterns or schema, characterized as need to function, can be defined from a cognitive point of view, which are peremptory as well as cyclical in nature. The motivational formulations which I will present in the last chapter will, I hope, demonstrate this.

Wolff (1963) also suggests in the above mentioned article, that the need to function, unlike motivation cannot be displaced from one goal to another. I will not address this last point since a response to it would require some exposition of concepts of representation which is beyond the scope of this dissertation.

Finally, in "Cognitive Considerations for a Psychoanalytic Theory of Language Acquisition" Wolff makes an assumption about Piaget's work which I do not think is warranted. Thus, he assumes that for Piaget, all sensorimotor patterns are of equivalent motivational valence.

> ...Piaget subsumes all motivation under the need to function, and implicitly assumes the intensity

> of different needs to function to be equal for all sensorimotor actions, regardless of organismic state or instinctual-drive tension. (p.334)

It is true that there is no immediately evident corollary, in Piaget's theory, to the energy concept. There is also no immediately evident alternative explanation of motivational intensity in this theory. However the absence of an explanation of motivational intensity cannot, I think, be taken as indication of an assumption that all actions are of equal value to the organism. I submit that differences in intensity revealed in the variety of sensorimotor functioning can be explained, within a Piagetian framework, without reference to an energy concept. Again I hope to demonstrate this in the last chapter of this work.

To summarize here, I will say that Wolff comes close, several times, to an integral integration of psychoanalytic and Piagetian thinking. However, his efforts are obstructed by his use of formulations of psychoanalytic motivational concepts which depend on the energic model.

However, since the time of Wolff's original presentation, it has become much more common, in psychoanalytic circles to criticize motivational concepts presented in the terms of the energic model.

Furthermore, since the publication of Wolff's Developmental Psychologies of Jean Piaget and Psychoanalysis (Wolff, 1960) and coincident with Wolff's article on language acquisition, an alternative formulation of psychoanalytic motivational concepts has been made possible with the publication of George Klein's Peremptory Ideation (1967).

I will devote the rest of this chapter to summary of some criticisms of psychoanalytic energy concepts. Then in the following chapter I will summarize Klein's work and suggest some extensions of that work.

Energic Concepts

In a panel devoted to the topic of psychic energy, Robert Wallerstein (1977), as moderator of that panel, remarked that the concept

of psychic energy is "one of the most obscure, most obfuscated, and most controversial of concepts in psychoanalysis." (p.529)

Wallerstein reported that the concept of psychic energy changes over time in psychoanalysis. However he pointed out that, despite its varying definitions, the concept was essentially intended to explain phenomena of intensity in motivation. Wallerstein mentioned that some have criticized the concept of psychic energy because there is no way of measuring precisely, intensity in psychoanalytic theory. Wallerstein did not think this is a valid criticism of the energic model. He suggested that other, more significant criticisms of that model existed. Wallerstein suggested, too, that some of the controversy surrounding psychic energy has arisen concretely, whereas Freud intended it metaphorically.

Wallerstein (1977) concluded his introduction to the panel with a question directed to those who would continue to use energic concepts and a question to those who would reject the energic model.

To those who would continue to use the energic model Wallerstein poses the question of how they would explain the concept of pleasurable tensions when the model assumes that the aim of the organism is to keep itself free of tension.

To those who would put aside the energic model Wallerstein asks how the individual's resolution of conflict can be explained without referring to quantitative considerations.

Members of the panel differed in their adherence to or rejection of the energic model.

Rosenblatt and Thickstun (1977), in their essay on "Energy, Information and Motivation: A Revision of Psychoanalytic Theory," were severely critical of the energic model.

They state,

> the theory of psychic energy fails to meet the minimal criteria of acceptable scientific methodology in six major areas: (1) There is internal contradiction and lack of consistency; (2) it is a logically closed system misusing metaphor as fact; (3) it uses tautological renaming to masquerade as explanation; (4) it cannot explain all relevant data; (5) it leads to a false sense of explanation, and (6) it promotes a mind-body dualism, preventing articulation with related sciences and scientific data. (p.537)

Rosenblatt and Thickstun (1977) go on to provide examples which support their criticisms of psychoanalytic theory.

For instance in justifying their statement that psychic energy leads to false sense of explanation they say,

> Instances of psychic energy leading to a false sense of explanation are all too numerous. For example, the diminished response of the nursing infant to auditory stimuli is 'explained' as due to the utilization of all available psychic energy in the internal processes, leaving none remaining to attend to the external stimulation. Such explanation ignores the considerable evidence from neurophysiology and other fields that the organism is active in the formation of its perceptual world and active in its inhibition of external stimuli. Selective inhibition of perception is produced, not by a diminution of available psychic energy, but by a centrally produced inhibition, occurring peripheral to the cortex. The mechanistic concept of a quantity of energy that is no longer available because it is used elsewhere blinds us to the view of the organism as actively adaptive, as blocking disturbing external stimuli, a view quite different from one of the organism as passively subject to shifting quantities of psychic energy. (pp.540-541)

Rosenblatt and Thickstun then suggest that an information-processing or information-engineering model would provide a more suitable basis for motivational concepts than the energic model.

Rosenblatt and Thickstun then set forth such a model. While there are many interesting features to their model I will not discuss its specifics here. I will discuss another information processing model, which provides a basis for my integration of Piaget and psychoanalysis, in detail in the following chapter.

Milton Horowitz (1977), another panelist, has more favorable things to say about the energic model than Rosenblatt and Thickstun. While Horowitz acknowledges that energic concepts may not provide a valid basis for understanding the neurophysiological basis of behavior he suggests, nonetheless, that the concepts of the energic model are useful in the technical work of psychoanalysis. Thus he suggests that the energic model has proved useful in the understanding of dreams, symptom formation and conflict. He believes that alternative models cannot encompass notions of conflict as well as the more traditional energic model. He suggests that alternative models may be useful in the study of the autonomous functions of the ego.

Merton Gill (1977), also on the panel counted himself a critic of the energic model. Gill (1977) connected the energic concepts to Freud's attempts to find a natural science underpinning to psychoanalytic theory. Freud, he suggests, meant the dynamic, economic and topographic points of view to be understood in an "explicitly neurophysiological-biological sense". (p.583)

Gill suggests that such a natural science underpinning is not necessary to the theory. He suggested that psychoanalysis as a theory has as its primary focus the clarification of our understanding of human meaning. According to Gill, a theory of motivation that seeks to explain conflict and its resolution does not necessarily have to include energic concepts. Conflict, he suggests, can be understood as deriving from an incompatibility of meanings rather than from the cathexis of energy. As a theory of human meaning, psychoanalysis, Gill believed, does not require a theory 'meta' to it in order to be considered complete.

Gill does not object to interdisciplinary studies. What he objects to is the stance that psychoanalytic tenets must be validated by the proposition of another theory.

Thus Gill (1977) says,

> To argue that metapsychology is not a psychoanalytic discipline is not to say that the sciences of man need not include interdisciplinary studies like neuropsychology, biopsychology, and sociopsychology. It is only to say that psychoanalysis as such is restricted to the study of individual man as a creature of meaningful intentions. (p.594)

Gill (1977) recognizes too, that some psychoanalytic theorists do not take energic concepts literally. These theorists argue that energic concepts are meant to be understood as metaphor, characterizing not biological or neurophysiological events, but psychic events.

Gill (1977), however, finds the use of energic concepts troublesome, even when these concepts are taken as metaphor. Energic concepts are not only unnecessary to psychoanalytic theory, he suggests, they have a "deleterious" effect on the theory and on

clinical practice (Gill, p.591). He believes that the energic metaphor,

> can be shown to be a derivative of infantile psychosexual fantasies in which the mind is equated with an organ that can ingest, retain and excrete substances. (p.588)

In clinical practice, he suggests, the acceptance of the metaphor as theory can obscure the need for analysis of primitive psychosexual fantasies expressed in the language of the metaphor. The acceptance of these concepts as metaphor interferes with the analysis of the meaning concealed in the metaphor.

Benjamin Rubenstein was not on this panel. However, like several theoreticians on the panel, Rubenstein has been critical of energic concepts in psychoanalysis. Rubenstein (1967) has suggested that these concepts are of limited usefulness in metapsychology and of questionable validity from a neurophysiological point of view.

Rubenstein (1967) reports that "in current descriptions of nervous functioning, the concept of information plays a much more prominent role than the concept of energy."

Rubenstein suggests that there is no reason to retain the concept of psychic energy. He suggests that physiochemical energy plays little part in the activation of structures, that different parts of the nervous system are functionally linked together by information rather than energy and that structures operate on their own stored energy and that therefore energy cannot be said to activate a structure or be the basis for motive pressure.

Rubenstein (1967) concludes, like Rosenblatt and Thickstun (1977) that it makes sense to replace the energic model with an information processing model.

I have made no attempt, in the preceding pages to present a comprehensive survey of criticisms or affirmations of the energic model. However I think that this survey demonstrates that there is sufficient justification for relying on a model of motivation, alternative to the energic one, in attempting to integrate psychoanalytic and Piagetian thinking.

No uniform prescription for the further development of psychoanalytic theory, derives from increasing dissatisfaction with the energic model. Dissatisfaction with the energic model, as we have seen, stems from different sources and leads to differing visions of the future of psychoanalytic theory.

On opposite ends of the spectrum are those like Rubenstein, who propose that psychoanalytic concepts be reformulated in a language compatible with current neurophysiological data and those like Gill and Schaefer, who propose that psychoanalytic research proceed toward the clarification of human meaning.

The theorists who focus on meaning do not necessarily deny that biological and/or neurophysiological factors have an impact on the development of meaning. What is missing then, from my point of view, are theoretical constructs that would make it possible to specify that impact.

Jean Piaget follows the development of intelligence from its origins in biology to its full realization in abstraction. Piaget's careful tracing out of the path from biological to abstract structure might be useful in filling in the gaps between our understanding of biology and our understanding of human meaning. Piaget's theory is, after all, a theory which concerns itself with the development of human meaning.

I have no pretensions about bridging the gap between biological concepts and concepts of human meaning in this dissertation. In fact I will not deal at all with the issue of representation, an understanding of which is essential to an understanding of human meaning. However, Piaget does address the issue of the development of representation, though he does not consider that development in its relationship to motivation.

By reformulating psychoanalytic motivational concepts in terms compatible with Piaget's theory I will be taking only a first step in a long process

which would eventually lead to a demonstration of the relevance, for a psychoanalytic theory of human meaning, of Piaget's analysis of the development of thinking. It would also lead to a demonstration of the relevance, for Piaget's theory, of the psychoanalytic theory of motivation.

CHAPTER III

GEORGE KLEIN'S PEREMPTORY IDEATION: A CRITICAL SUMMARY

In "Peremptory Ideation: Structure and Force in Motivated Ideas," George Klein (1967) finds fault with aspects of the motivational theory of psychoanalysis, particularly those aspects having to do with concepts of energy and drive. Klein (1967) then presents an alternative motivational model which he has developed and which encompasses some of the concepts essential to psychoanalytic motivational theory.

Significantly, Klein finds a motivational model which is not also a cognitive model unsatisfactory. According to Klein, cognition is implicit in motivation and motivation involves ideation, affect and action.

> I propose to speak about motivation in terms of properties of a behavioral unit of ideation, affect and action...Inasmuch as motivation involves knowledge it is cognitive...conversely, insofar as cognition has direction, it is motivated. (p.84)

Klein recalls Freud's classical view of drives.

> According to Freud, drives are specific energies, libidinal or destructive, with specific aims, which decide the person's behavior. Thus the purposiveness of a person's thought or behavior is ascribed to distinctive energies which drive him. (p.85)

Klein finds this viewpoint troublesome.

> From the standpoint of consistency, it is difficult to conceive of energy as directionally specific. (p.85)

Klein (1967) suggests,

> ...it seems timely to talk more about the ideational units in which drives are represented and less in terms of purely energic or quantitative considerations which are by now customary in discussions of drive. (p.85)

And,

> Motivation is a matter of accounting for changes in direction of behavior and the problem seems more manageable if we start out from the assumption, not that energy changes its quality but that one and the same physical (neural) energy has changed its direction in traversing the structures that organize behavior. (p.85)

Klein (1967) does not dismiss entirely the concept of energy. He allows that such a concept might have some value in psychoanalytic theory. However, he

does not believe that questions of intensity or direction in motivation are in any way clarified by the use of energic or drive concepts. He suggests that motivation can be more clearly understood if its relationship to cognitive organization is explicated. Klein reminds his readers that in Freud's earliest work symptoms were considered to result from the repression of ideas.

> ...it was a forceful idea - cognitive structure - incompatible with other ideas that was the main source of difficulty underlying hysterical neurosis: The central doctrine of the theory was that a repressed idea gave rise to the symptoms (Breur and Freud (1893-1895)...the result of conflict was a repressed but still active memory - the memory of a real event which was oncompatible with the main body of a patient's socially and consciously acceptable ideas. (p.86)

Klein (1967) points out that clinical data still consists of "thought products"

> ...data about drives are still thought products, mainly interpretable in terms of unconscious ideas about sexuality and aggression which exert an imperious hold on behavior. (p.87)

Klein (1967) finds fault with that aspect of drive theory which equates drive, and motive force, with internal stimulation. However he does not

suggest that external stimulation alone either can account for motive force. Stimulation, he suggests, is significant in motivation only insofar as it is meaningful, that is, cognitively represented.

> We are not motivated either by external stimulation or by internal stimulation alone. Without...a mediating structuring process, external and internal stimulation have activating but not directional effects. (p.87)

Klein (1967) suggests,

> ...We must find a way to conceptualize as attributes of cognition the properties of aim and peremptoriness which Rapaport (1960b) pointed out as two essential criteria of drive; we must state what these terms mean in respect to the activity of thought. (p.87)

Klein (1967) then attempts to account for these properties in a model of motivation in which cognitive activity is accorded the primary role Klein thinks it plays.

> The locus of motivation...is to be sought within the structure of a train of thought. (p.87)

He defines a train of thought.

> By a train of thought I mean a temporally extended series of events linked at the receptive end via exteroceptors and visceroceptors to stimulation, at the motor end to affective and effector processes, and to each other by facilitative and inhibitive

> signals in a patterned sequence. I assume, too, that these structural elements of a train of thought are connected flexibly and not in a fixed anatomical linkage, the same elements may participate in many trains of thought. (p.87-88)

Implicit here is the idea that trains of thought are generated within a network, as varying connections between elements in that network occur.

Klein (1967) distinguishes between two aspects of a train of thought:

> (a) the nature of the components of the train of thought - its ideational, affective, and motor connections - and (b) the temporal organization of these components. (p.89)

Klein (1967) thinks of a train of thought as a cycle.

> The cycle of events...is terminated at the region from which it starts...the pattern of events itself eventuates in stimulation which has the effect of terminating the excitations that instituted the whole cycle. (p.90)

The cycle then, is "self-closing." (p.90) Direction and intensity of motivation according to Klein (1967) "derive from two features...(of a train of thought)...the self-closing pattern of excitations within the structure, and the segment called a primary region of imbalance." (p.90)

Klein (1967) suggests that an example of such a cycle of events may be found in the experiences that lead to the quenching of thirst. In the case of thirst, dryness in the mucous membranes of the mouth and throat,

> Water contacts and stimulates the mucous membranes of the mouth and throat and dryness is lessened. This stimulation continues until the thirst excitations at the source become less and less dense, or, as it were, switched off. (p.91)

The behavior cycle here is initiated with an imbalance in the mucous membranes of the mouth and throat and terminated with a reestablishment of balance in this region. Klein (1967) calls the region of excitation which initiates this patterned, self-closing sequence, "a primary region of imbalance." (p.91)

The directional aspect of motivation, according to Klein "is given by the fact that the unit's events are self-closing." (p.92) In other words direction is given by the fact that only by termination of excitation at the primary region of imbalance is the cycle completed. In the case of thirst, dryness of the mucous membranes is counteracted by the stimulation of those membranes with water.

Klein (1967) mentions that linkages between the various events in a train of thought can be brought about in several ways. "This linkage can be brought about by three kinds of activation of the system's elements: priming, facilitation and inhibition." (p.92)

He discusses priming first.

> In a train of thought, the elements can be raised to a higher-than-usual level of excitation, but remain at a level lower than what would be necessary for them to become stimulating or facilitative...Presumably phenomena of set, readiness and sensitization would be behavioral indications of it. One might even speak of a primed event as a biasing either of reception, of transmission, or of effector release. (p.92)

In reference to facilitation and inhibition Klein says,

> when an element is activated to a level where it is not simply primed, but is capable of stimulating adjacent elements, its transmitted effect can facilitate or inhibit...Thus the integrative effect that occurs in the linking of one element to another by stimulation is assumed to result not only from facilitating stimulations, but from inhibiting ones as well. (p.92)

Klein (1967) objects to the identification of motivational satisfaction, or of "discharge" with the reduction of quantities of energy or tension. He finds that thinking of terminal stimulations as

balancing rather than tension-reducing enables him to include qualitative considerations in his conceptualizations of discharge.

Klein (1967) says,

> This is meant to provide for an important property of many motivations generally overlooked in tension-reduction models - what may be termed an aesthetic component drive. When we are hungry for ice-cream, we may want not simply ice cream, but a certain flavor, and either in a cone, a sundae, or a soda...(p.93)

He reminds us that even Freud was not entirely satisfied with an exclusively quantitative view of discharge. He reminds us of Freud's suggestion that a more complete view of discharge might have to encompass qualitative as well as quantitative considerations.

In Klein's model

> discharge is considered to be a qualitative matter of appropriate, matching stimulations - of imbalance 'quieted' in Freud's terms, by stimulation occurring in the same region...Discharge means termination: it signifies that the concentration of events creating a primary region of imbalance is dissipated through negating or inhibitory feedback...(p.96-97)

The completion of a train of thought, then occurs when feedback indicates that the requirements for balance originating at the primary region of imbalance have been met.

Klein (1967) summarizes,

> Motivation of a train of thought starts as a local increase of facilitating excitation at a particular event region of an ideomotor system... Excitation proceeding from the primary region of imbalance steers behavior into efforts at bringing about particular conditions in the environment (and in thought) that could reduce excitation in the initiating region - i.e. bring about feedback that will inhibit the initiating imbalance of the cycle. Such feedback would include reports of instrumental actions, perceptual events, memory events...(p.94)

The intensity of motive sequences may vary. Relatively greater intensity of motives may be brought about by a variety of conditions.

Insufficient feedback to the region of imbalance may be a condition contributing to intensity. Thus, initiating excitations at the region of imbalance may persist when not all of the elements necessary for resolution of imbalance are present in terminal feedback. Klein refers to the example of thirst again in illustrating this situation. He suggests that a dream concerning thirst gratification may result in a partial or temporary diminution of thirst. However as long as actual gratification of thirst does not occur and initiating excitations at the region of imbalance are not inhibited, the motive sequence in which thirst is experienced continues to be activated.

Intensity of motivation may also be determined, according to Klein by "conditions that promote density of facilitation at the primary region." (p.101) He goes on,

> Density refers to the variety of converging, qualitatively distinct events that comprise a primary region of imbalance. From the viewpoint of discharge requirements, it refers to the variety of matching feedback stimulations that are needed to bring component regions of a train of thought to a balanced state. (p.102)

Density, in other words, refers to the complexity of the imbalance, or to the complexity of the wish which is constituted with the activation of the primary region of imbalance. Klein (1967) illustrates the nature of density with several examples. He points out that a somatic need, such as the need for food, may be aroused by conditions other than simple somatic insufficiency. Oral wishes, for example, may be stimulated by injuries to self-esteem. Sexual desires, as another example, may be aroused in the context of fantasies..."of rejection, loss and ego injury." (p.103) Requirements for terminal inhibition, then, will be more complex, depending on the complexity of arousal and intensity of motivation may increase with its complexity.

Intensity of motivation may also be increased, "when feedback is aborted, inhibited, or counteracted." (p.103) Interference with terminal feedback, according to Klein is particularly likely when wish satisfaction is associated with conflict and defense.

> Such circumstances give rise to paradoxical impulses of both an excitatory and inhibitory kind. The anticipated pleasure may prime certain ideomotor channels of search, approach and enjoyment of the wished-for object. In case of conflict, however, inhibitory transmissions counter each such specific excitation of approach and perhaps even, in a measure, the anticipatory priming of an approach channel itself, thereby making the avenues of approach less stimulable. (p.103)

In other words arousal of a wish occurs, and, with that arousal, the excitation of channels which might lead to or result in the satisfaction of that wish. In cases of conflict and defense, however, inhibition of these channels occurs simultaneously and the person is prevented, by the inhibitory impulses, from achieving the wished-for satisfaction. The initiating excitations, then, involved in the arousal of the wish, cannot be inhibited by the matching stimulations which would have

been involved in wish satisfaction. Arousal is continued and the intensity of the wish is heightened with the lack of facilitation of events leading to wish satisfaction.

Klein (1967), through the various formulations summarized in the preceding pages, attempts to account for direction and intensity of motive pressure, that is, for qualitative and quantitative considerations in motivation.

However, Klein is only partially successful, for he does not account for some of the central economic and directional precepts of psychoanalytic theory. More specifically he does not account for the importance of some motives relative to others. For instance, the premise that sexual motives occupy a principal position in the hierarchy of human motives is basic to psychoanalytic theory. In another article "Freud's Two Theories of Sexuality" Klein (1969) emphasized the relationship of sexual motives to past experiences of arousal and to issues of self and identity. However Klein did not account for the predominance of these motives in the terms of his model.

It is true that the primacy of sexual motives might be attributed to their intensity. It is also true that Klein has suggested that intensity of motivation might be determined by a variety of conditions. However, Klein did not suggest that any of these conditions apply more specifically to sexual motives than to other motives. An explanation of the primacy of these motives requires some elaboration, then, of his model.

In the energic model primacy and persistence of sexual motives are accounted for by the constancy principle. Klein is severely critical of that aspect of the constancy principle which holds that instinctual energy generated within the body accounts for the motivational importance of sexuality. He does not reject the idea that internal stimulation might be a factor in motivation. However he notes that sensual pleasure can be directly elicited and he emphasizes, as I have mentioned above, the relationship of motivation to past experiences of arousal.

In considering constancy of motive pressure it is important to remember that even in the energic model it is not motive pressure which is absolutely constant.

It is the internal generation of stimulation or energy which is constant. Motive pressure itself varies as processes of discharge occur or are inhibited.

As Klein's model is presently formulated it does not account for cyclical variations in motive pressure and the corresponding recurring intensification of sexual motives. Neither does it account for the characteristic of self-generativeness attributed to sexual motives in traditional psychoanalytic theory. I do not think that it is necessary to revert to the energic model in order to suggest that internal factors play a more significant role in determining motivation than that accorded them by Klein.

An elaboration and modification of Klein's model, and an integration of that elaborated model with Piaget's theory will make it possible to account for the recurrent intensification of sexual motives and for autonomous quality attributed to them. It will also make it possible to account for the assumption, which is so central to psychoanalytic theory, that sexual motives are of primary importance in the hierarchy of human motives. At the same time it would account for variability in that hierarchy.

I would extend Klein's model in two ways:

1. By defining a train of thought in which the sequence of events leads not only to self-closing but also to the reactivation of the sequence.
2. By making some preliminary hypotheses about the organization within which trains of thought, as defined by Klein, are generated.

The first of these extensions, I believe, will lead to the definition, within psychoanalytic theory, of a conceptual correlate of the Piagetian concept of schema.

Let me be more specific about extending Klein's work. To account for the recurrent intensification of motive pressure in the terms of Klein's model it is necessary to specify a sequence of events which is not only self-closing but also in some ways, self-reactivating. Such a sequence of events would lead not only to the termination of excitations from the primary region of imbalance but also to their reemergence.

If the assumption that conditions at the primary region of imbalance may vary with the progression of events in the sequence is added to Klein's framework, it becomes possible to posit such a sequence of events.

The sequence is not entirely self-reactivating but sets the conditions under which reactivation may occur.

In its simplest form such a sequence might consist of one in which the threshold for receptivity to stimulation at the primary region of imbalance was heightened during the progression of events and lowered at its completion. This assumes that feedback to the primary region, influences not only the termination of the sequence of events but also influences conditions at the region of imbalance throughout the sequence. The cyclical change in threshold for stimulation would assure that, given appropriate stimulation, the cycle of events making up this particular sequence of motivated action would recommence. Alternatively, reactivation might refer not to a particular sequence but to a class of similar sequences. Reactivation of the cycle then, would mean not that a particular sequence was reactivated but that a sequence of events from within a class of similar sequences was activated.

The example I have given above is meant to illustrate only one of a number of possible variations of a train of thought that could be considered

self-reactivating. Furthermore, this example is greatly simplified and does not really do justice to the possible complexities that may characterize such trains of thought.

What essentially identifies such a cycle, and what gives it direction, is the fact that the various steps in the progression lead recurrently to one another. I remind the reader that conditions at the region of imbalance may vary not only with the termination of a cycle of events but also with the progression of that cycle from one phase to another. In the self-reactivating cycle the progression from one phase to another leads to change in conditions at the region of imbalance. This change then leads to further progression in the sequence which leads again to changing conditions at the region of imbalance. In this way the cycle continues. At each step of the sequence specific requirements for balancing stimulation are met and other requirements emerge or become salient. Each step in the progression of events is a consequence of the preceding step and leads to the following one.

Quality and intensity of motivation may vary as the self-reactivating cycle progresses and as conditions at the region of imbalance vary with that progression. However quality and intensity, I assume, vary not only with the progression of a specific sequence of events but with the relationship of that sequence to other sequences of events. I assume too, that sequences of events are not indefinitely self-reactivating, but are self-reactivating only when certain conditions exist. I assume then that sequences of events are always generated and terminated in relationship to other sequences of events. Within this context self-reactivating sequences are not repeated indefinitely. Such sequences are reactivated only as long as their relationships to other sequences remain essentially unchanged. However I assume that the relationships between sequences of events are ultimately variable. Conditions at the region of imbalance associated with any particular class of motive sequences may vary not only with the progression of events which constitutes that motive sequence but also with changes

in the relationship of that sequence to other sequences. Self-reactivating sequences arise and are terminated, then, in the context of varying relationships to other sequences of events.

It follows from Klein's work that sequences of events are generated in relationship to one another in the context of a network in which elements exist in potential relationships to one another. I will assume that the potential for relationships between elements in the system is, at first, given by biological structure. I assume also that there is a later elaboration of this network with development.

A mapping out of the original biological network would, I suggest, indicate that the pathways through which inhibitory, priming or facilitating signals are transmitted are variably distributed. There are differences, then, for different elements and systems of elements, in the quantity and diversity of connections to other elements and systems of elements.

Imbalance within this network, I assume, occurs as certain connections between elements are actualized rather than others. Imbalance, then corresponds to a particular arrangement of elements in organization

or to a particular variation or series of variations in the relationships between elements in organization. Imbalance may, at the same time, correspond to the stimulation of certain regions or bodily zones, that is, to a localized increase or decrease in stimulation. The activation of a region of imbalance then corresponds to the realization of a particular ordering or orderings of elements in organization as well as to localized changes in stimulation.

Imbalance, as a consequence of a particular ordering or arrangement of elements in organization can be corrected only by a reordering or rearrangement of elements. A self-reactivating sequence would be defined as a cycle in which successive reorderings of elements in organization led recurrently to the ordering with which the cycle began. Reordering may occur in the progression of a specific sequence of events and/or in the relationship of that sequence to other sequences.

By assuming that the distribution of pathways through which elements are linked to other elements is variable I am able also to assume that the likelihood that imbalance will occur or the potential for imbalance is greater at some regions than at others. The kind and

amount of stimulation occurring at a particular region depends on the variety and number of potential connections existing between elements corresponding to this region and elements corresponding to other regions.

Klein's notion of density is relevant here. Density, he says,

> refers to the variety of converging qualitatively distinct events that comprise a primary region of imbalance. From the viewpoint of discharge requirements, it refers to the variety of matching feedback stimulations that are needed to bring component regions of a train of thought to a balanced state. (p.102)

The potential for density, I suggest, varies according to the richness and complexity of pathways between systems of elements corresponding to one region and systems of elements corresponding to other regions. What these pathways make possible is the influencing of one system by events in another. The more varied and numerous the pathways linking one system of elements to other systems the more likely it is that that system will be influenced by the events in other systems. The more varied and numerous the pathways linking a particular system of elements to other systems, then, the more likely it is that the reordering which characterizes that particular system will be influenced by reordering in

other systems. Imbalance and the correction of imbalance may be more or less determined by the relationships of systems of elements to one another.

Conclusion

In this chapter, then, I have discussed the model of motivation presented by George Klein (1967) in "Peremptory Ideation." Klein rejects the classical psychoanalytic view which attributes the quality and intensity of motivation to specific drives and energies. He suggests that motivation necessarily involves thought and considers quality and intensity of motivation as factors of the trains of thought within which motives arise. Motivated trains of thought, according to Klein are initiated at a primary region of imbalance and terminated with the inhibition of excitation at the primary region of imbalance. Motivated sequences of events, he suggests, are self-closing because they are terminated at the region from which they start. It is this self-closing aspect of trains of thought which determined direction and it is "the number, persistence and unrelieved repetitiveness at the region of imbalance" (p.92) which determines intensity. Klein went on to talk

about the different types of linkages that may exist between elements in a system. He also considered a variety of situations which might make for intensity of motivation. Finally he suggested that discharge, or motive satisfaction, was not a matter of reducing stimulation but of balancing, or of achieving "appropriate, matching stimulations."

I suggested that while Klein had partially accounted for direction and intensity of motivation he had not accounted for some of the essential premises of psychoanalytic motivational theory. I then proposed some extensions and modifications of Klein's work. I defined a train of thought which could be considered self-reactivating under certain conditions and suggested that such trains of thought were generated within a network in which elements were potentially linked to one another through varying kinds and numbers of connections. I suggested that imbalance within this network corresponded not only to the activation of a specific bodily zone but also to a particular ordering or arrangement of elements in organization. A self-reactivating sequence would be defined then as a cycle in which successive

reorderings of elements in organization led recurrently to the ordering with which the cycle began. Finally, I suggested that such sequences are not indefinitely self-reactivating but arise and are terminated in the context of their relationships to other sequences of events.

I stated that I would attempt to account for cyclical variation in motivational intensity and the autonomous quality of instinctual motives. I proposed also that I would account for the relative primacy of sexual motives in the hierarchy of human motives, while at the same time accounting for variability in that hierarchy. I suggested that an elaboration of Klein's model with Piaget's work would enable me to account for these concepts. In the following chapter then is a summary of Piaget's work in The Origins of Intelligence.

CHAPTER IV

JEAN PIAGET'S THE ORIGINS OF INTELLIGENCE: A CRITICAL SUMMARY

According to Piaget (1952) "intelligence is a particular instance of biological adaptation." He states that hereditary biological factors implicated in the development of intelligence are of two types.

Hereditary factors of the first type are connected with the nervous system and sensory organs. These factors, Piaget (1952) suggests, influence the building up of "our most fundamental concepts." As he says,

> we perceive certain physical radiations but not all of them and matter only of a certain size...(p.2)

The influence of these factors, which are structural, is significant but is eventually transcended in intellectual development.

Piaget (1952) emphasizes the difference between structure and function and states that hereditary factors of the second type are involved in the transmission of functions.

> Just as the organism would not know how to adapt itself to environmental variations if it were not already organized, so also intelligence would not be able to apprehend any external data without certain functions of coherence (of which the ultimate expression is the principle of noncontradiction), and functions making relationships, etc...(p.2)

Piaget (1952) suggests that there are invariant functions in the development of intelligence which influence intellectual development. These functions are not necessarily specific to intelligence, according to Piaget, but may be operative at all levels of behavior, including the strictly biological. However while Piaget stresses the continuity which exists between biological functioning and intellectual functioning he does not ignore the differences which exist between the biological and the intellectual realm.

> ...the functional relations which can exist between intellect and biological organization can in no way diminish the value of reason but on the contrary lead to extending the concept of vital adaptation... If biological adaptation is a sort of material understanding of the environment, a series of later structures would be necessary that conscious gnostic image may emerge from this purely active mechanism. (p.8)

Similarly, Piaget (1952), while emphasizing the continuity that exists at all levels of intellectual development, also points out that there are qualitative differences in thinking which exist at different levels

of intellectual development. These qualitative differences in thinking refer to different structural levels of organization.

> Just as the main functions of the living being are identical in all organisms but correspond to organs which are very different in different groups so also between the child and the adult a continuous creation of varied structures may be observed although the main functions of thought remain constant. (p.4)

The functions which occur at the biological level and at all levels of intellectual development exist, according to Piaget (1952), "within the framework of the two most general biological functions: organization and adaptation." It is the influence, on intellectual development, of these organizing and adaptive functions which is Piaget's primary focus in the Origins of Intelligence (Piaget, 1952).

Piaget (1952) defines adaptation,

> There is adaptation when the organism is transformed by the environment and when this variation results in an increase in the interchanges between the environment and itself which are favorable to its preservation. (p.5)

Adaptation is accomplished through the processes of assimilation and accommodation. These processes occur in the context of already existing organization. It is through assimilation that organization is conserved even as it is modified.

According to Piaget (1952),

> The organism is a cycle of physicochemical and kinetic processes which, in constant relation to the environment, are engendered by each other. Let a, b, c, etc. be the elements of this organized totality and x, y, z, etc., the corresponding elements of the surrounding environment, the schema of organization is therefore the following:
>
> (1) a + x ——— b,
>
> (2) b + y ——— c,
>
> (3) c + z ——— a, etc.
>
> The processes (1), (2), etc, may consist either of chemical reactions (when the organism ingests substances x which it will transform into substance b comprising part of its structure) or of any physical transformations whatsoever, or finally, in particular of sensorimotor behavior (when a cycle of bodily movements a combined with external movements x result in b which itself enters the cycle of organization). The relationship which unites the organized elements a, b, c, etc. with the environmental elements x, y, z, etc. is therefore a relationship of assimilation, that is to say, the functioning

> of the organism does not destroy it but conserves the cycle of organization and coordinates the given data of the environment in such a way as to incorporate them in that cycle. (pp.5-6)

It is through accommodation that organization is modified even as it is conserved. Piaget illustrates,

> Let us therefore suppose that, in the environment a variation is produced which transforms x into x^1. Either the organism does not adapt and the cycle ruptures, or else adaptation takes place, which means that the organized cycle has been modified by closing up on itself:
>
> (1) $a + x^1 \text{ ——— } b^1$
>
> (2) $b^1 + y \text{ ——— } c$;
>
> (3) $c + z \text{ ——— } a$. (pp.5-6)

Piaget calls the cycles comprised by these elements existing in relationship to one another, schema.

Implicit, I think, in Piaget's conceptualization of schema and perhaps not well illustrated in the diagrammatic definitions of assimilation and accommodation given above, is the idea that relationships between

elements in organization vary with the progress of the cycle that is the schema. "A schema," according to Piaget (1952), is "the dynamic expression of organization." Thus, what can be seen from one perspective as a cycle of events leading one to another, then, can be seen from another perspective as the expression of variation in the interrelationship of elements in organization over time. The advance of a schema then corresponds to a cyclical redefinition of relationships between elements in organization and a corresponding cyclical redefinition of the relationships between the organism and its environment.

Following this line of reasoning, it can be inferred that adaptive modifications occur in an organization that already encompasses change. In other words, organization is not invariant. What is modified, then, with the modification of schemata in adaptation is not an unchanging organization but a cyclically varying pattern of interrelationships that exists as the expression of organization.

According to Piaget (1952), the organism's attempts to modify its structure are balanced by its attempts to conserve already established structure, that is, by an equilibrating process.

> ...adaptation is an equilibrium between assimilation and accommodation...intellectual adaptation, like every other kind, consists of putting an assimilatory mechanism and a complementary accommodation into progressive equilibrium... (p.6)

Piaget (1952) presents no formal definition of equilibrium, nor of the equilibrating process tending toward it, in the Origins of Intelligence although he expanded on the concept of equilibrium in later works. However, he does suggest here that equilibration is operative in organization as well as adaptation. It follows then, that the progressive equilibration between assimilation and accommodation is effected in the recurrent reorganizations of relationships in organization that occur with the progression of schemata and also with the modifications of those schemata as they function in interrelationship with one another in the environment.

In other words equilibration is active on several levels simultaneously. Equilibration occurs in the recurrent reorganizations of elements in relationship to one another that occur with the advance of the individual schema.

Equilibration occurs also in the recurrent reorganization of relationships between individual schema as they function in relationship to one another.

Equilibration also occurs as schemata are enacted in the organism's interrelationships with its environment.

In discussing the organism's modifications of its organization in adaptation, Piaget makes a distinction between a state of adaptation and process of adaptation. He also makes a distinction between actual equilibrium and an ideal equilibrium. As I understand Piaget, if a state of total adaptation could be achieved and an ideal equilibrium attained it would mean that correspondence between the schemata of the organism and the environment would be complete. However a state of complete adaptation is never reached and an ideal equilibrium never fully realized. The actual equilibrium achieved at any given stage is incomplete and is subject to disruption to the

extent that the modification of the schemata of the organism according to the pressures of the environment has not been fully accomplished.

The equilibrium of the organism can be disrupted, too, when the relationships between elements in its organization are not fully elaborated, that is, as long as the potential for new relationships between elements exists. As development proceeds and, as the organism functions in interaction with the environment an elaboration of organization and a corresponding regulation of the progressive complexity of relationships between elements in this organization occurs.

The possibility for disruption of the stability of equilibrium exists as long as the possibility for a novel complication of the relationships between elements in an organization exists.

The organism, then, in the process of adaptation, strives to maintain a balance between conservation of existing schemata and modification of those schemata according to the variations of the environment. In the ideal state, never reached, the equilibrium between conservation of existing schemata and modification of schemata exists when modification of schemata is no longer necessary.

In the process of organization too, an equilibration between conservation of existing relationships in that organization and the complication and modification of those relationships occurs. In the ideal organization, never reached, potential relationships between elements in the organization have been fully elaborated.

The stability of equilibrium then, depends not only upon the development and elaboration of relationships between the organism and its environment but also upon the development of potential relationships and the elaboration of existing ones between elements in an organization.

In summary, Piaget maintains that with the progressive complication of organization the elements comprising it are combined in increasingly diverse ways and organization in this way therefore, becomes more mobile and flexible. Correlative to this increasing flexibility of organization there is an increase in the interactions of the organism with its environment and decrease in the likelihood that interaction with the environment will disrupt the stability of functioning

of the organism. At each stage of development, through the functions of organization and adaptation, there is an extension and diversification of existing schemata and the creation of new organization of schemata in relationship to one another and to the external world. At each stage, too, new schemata are derived from old ones and new ways of intercoordinating those schemata are developed.

With the progress from one state to another a process of equilibration operates. Thus the organism attempts to achieve a balance between conservation of existing relationships between elements in organization and modification of those relationships. Equilibration, then, occurs in the context of a regularly varying organization which is modified according to the variations of the environment and the possible variations of its elements in relationship to one another. Within this regularly varying organization no permanent state of equilibrium is ever achieved.

In the Origins of Intelligence, Piaget carefully follows the beginning stages of human intellectual development from its basis in the reflexes through the development of mental representation.

Piaget's conceptualizations of organization and adaptation and of assimilation, accommodation and equilibration are given substance in Piaget's observations and discussion of infant behavior. In the following pages I have summarized Piaget's discussion of infant development, in the hopes that this will illustrate more clearly how the processes of organization and adaptation (through assimilation and accommodation) are active in development.

Piaget's study of organization and adaptation in infant development begins with observations of neonatal reflexive behavior. Piaget makes no attempt to provide a complete picture of the biological organization present at birth. He comments on the complexity of this organization and limits himself to the observation of specific reflexes which function within this overall biological organization. That is, he focuses, at the start of his work, on the observation of organized cycles which exist within an overall cycle of operation without specifying the detail the cycle within which reflex cycles exist. According to Piaget, the reflexes within

this biological organization are constituted as systems of elements organized in relationship to one another. They are biologically adaptive mechanisms, capable of being activated by a variety of excitants. However the reflexes are not simply automatic mechanisms. The functioning of the reflexes is characterized by observable behavior and is subject to the influences of the environment. The reflexes need to be used in order to function adaptively. In their use gradual accommodation to external reality results in increasingly refined adaptive functioning. Piaget notes that even in the first few days of life the reflex organization gives evidence of a utilization of experience which enhances adaptation.

In the first few weeks of life both assimilative and accommodative processes are active in the functioning of the reflex. However there is little differentiation, at this stage, between assimilative and accommodative functioning. The reflex processes can be considered accommodative because contact with the environment is necessary to their consolidation and functioning.

Piaget (1952) says, "Accommodation exists because, even without retaining anything from the environment as such, the reflex mechanism needs the environment." (p.41) In addition contact with the environment may modify the activity of the reflex or may result in a coordination of relationships between the environment and the reflex.

> contact with the environment modifies, in a way, the activity of the reflex, and even if this activity were oriented hereditarily to such contact, the latter is no less necessary to the consolidation of the former. (p.30)

Piaget (1952) provides, as one instance of the accommodative process in action at this stage, the example of an infant who makes progress in the directedness and continuity of his search for the nipple.

> In the beginning (Obs. 2 & 3) contact with any part of the breast whatever sets in motion momentary sucking of this region, immediately followed by crying or a desultory search, whereas after several days (Obs.5), the same contact sets in motion a groping during which the child is headed toward success. It is very interesting, in the second case, to see how the reflex, excited by each contact with the breast, stops functioning as soon as the child perceives that sucking is not followed by any satisfaction as is the taking of nourishment (see Obs.5 & 8) and to see how the search goes on until swallowing begins. (p.31)

Piaget suggests that the process of assimilation is implied in the very functioning of the reflex.

> in a general way one can say that the reflex is consolidated and strengthened by virtue of its own functioning. Such a fact is the most direct expression of the mechanism of assimilation. (p.32)

Piaget (1952) discusses three variants of the process of assimilation occurring at this stage. He speaks of functional assimilation, generalizing assimilation and recognitory assimilation as being involved in the conservation and extension of reflex functioning.

Piaget observed, first of all, that the reflex, while capable of being activated by a variety of excitants, also seemed to be set in motion by its own functioning. This spontaneous repetition of reflex patterns appeared to increase as the reflex functioned in the first few weeks of life. Piaget called this spontaneous and repetitive functioning, functional assimilation. Functional assimilation is important in the conservation of the organized cycle of reflex behavior.

> ...from the start of this primitive mechanism, a sort of circular process accompanies the function, the activity of the reflex having augmented due to its own use...The counterproof of this is, as we have seen the progressive decay of reflex mechanism which are not used. (p.33)

The tendency, then, is for the reflex to reproduce itself. As it does so the reflex, according to Piaget, tends to incorporate every object capable of fulfilling the function of excitant.

Piaget (1952) noted that the child tended to incorporate increasingly varied objects into the reflex schemata. Generalizing assimilation occurs when repetitive reflex functioning also involves this incorporation of increasingly varied objects into reflex schemata.

> When, for example, the child is hungry but not sufficiently so to give way to rage and to crying, and his lips have been excited by some accidental contact, we witness the formation of this kind of behavior pattern...Thus, according to chance contacts, the child, from the first two weeks of life, sucks his fingers, the fingers extended to him, his pillow, quilt, bedclothes, etc.: consequently he assimilates these objects to the activity of the reflex. (p.34)

It is important to note here that Piaget does not ascribe conscious generalization to the infant.

Piaget (1952) also discusses a third type of assimilation. Recognitory assimilation does not involve, as does generalizing assimilation, the progressive adaptation of reflex functioning to an increasing range of objects. Instead, progressive adaptation is revealed, in the case of recognitory assimilation in the increasing selectivity of reflex response in certain states.

> What we have just said regarding the lack of differentiation which characterizes generalizing assimilation is in effect, true only with respect to states of slight hunger or of satiety. But it is enough that the child be very hungry for him to try to eat and thus to distinguish the nipple from the rest. Let us examine, from this point of view, the way in which the child rediscovers the nipple. Ever since the third day (Obs.3), Laurent seems to distinguish the nipple from the surrounding teguments; he tries to nurse and not merely to suck. From the tenth day (Obs. 4), we observe the alacrity with which he rejects the eider-down quilt or the coverlet which he began to suck, in order to search for something more substantial. Furthermore, his reaction to his father's index finger (Obs. 6) could not be more definite: disappointment and crying. Lastly, the gropings on the breast itself (Obs. 5 and 8) also reveal selectivity. (p.36)

Piaget (1952) does not mean to say that the child recognizes the nipple as an object. He simply "rediscovers a sensorimotor and particular postural complex (sucking and swallowing combined) among several analogous complexes which constitute his universe..." (p.37)

While Piaget (1952) distinguishes between the forms assimilatory activity takes he also feels that these forms are but one.

> The reflex must be conceived as an organized totality whose nature it is to preserve itself by functioning and consequently to function sooner or later for its own sake (repetition) while incorporating into itself object propitious to this functioning (generalized assimilation) and discerning situations necessary to certain special modes of its activity (motor recognition). (p.38)

Piaget (1952) suggests that reflex functioning during the first few weeks of life does show an historical development. However no nonheriditary behavior patterns are at first acquired. What is involved in development at the reflex stage is the consolidation and diversification of hereditary behavior patterns. The acquisition, on the other hand, of nonhereditary behavior patterns marks for Piaget, the beginning of a new stage in intellectual development.

Piaget says:

> At a given moment...the child's activity retains something external to itself, that is to say, it is transformed into a function of experience: in this respect there is acquired accommodation...(p.48)

With acquired adaptation the processes of assimilation and accommodation begin to be distinguished.

Accommodation at the reflex stage does not entail any departure from activity inherent in the very functioning of the reflex. While strengthening and diversification of reflex functioning occurs at this stage, repetition of the reflex cycle is not directed toward the conservation of variations in reflex functioning.

On the other hand, the accommodations made in the second stage entail some departure from hereditary functioning. These accommodations are conserved through repetitive assimilation.

> Whereas, in the reflex, assimilation only formed one entity with accommodation, henceforth the reproduction of the new act, or the assimilation of objects to the schema of this act, constitutes a process distinct from accommodation itself. (p.49)

Piaget (1952) cautions, though, that the distinction between the first and second stages is not

as clear in actuality as it is in theory. He asks, "how is it possible to have a clear idea of the moment when there is retention of some other condition external to the reflex mechanism itself?"

Piaget (1952) reports an early observation wherein the distinction between reflexive functioning and acquired adaptive functioning is not easy to make.

> Observation 11 - Laurent at 0:0(30) stays awake without crying, gazing ahead with wide open eyes. he makes sucking-like movements almost continually, opening and closing his mouth in slow rhythm, his tongue constantly moving. At certain moments his tongue, instead of remaining inside his lips, licks the lower lip, the sucking recommences with renewed ardor.
>
> Two interpretations are possible. Either at such times there is searching for food and then the protrusion of the tongue is merely a reflex inherent in the mechanism of sucking and swallowing, or else this marks the beginning of circular reaction. It seems, for the time being, that both are present. Sometimes protrusion of the tongue is accompanied by disordered movements of the arms and leads to impatience and anger. In such a case there is obviously a seeking to suck, and disappointment. Sometimes, on the other hand, protrusion of the tongue is accompanied by slow, rhythmical movements of the arms and an expression of contentment. In this case the tongue comes into play through circular reaction. (p.50)

Acquired behavior is more evident at a later date.

> During the third month he adds to the protrusion of his tongue and finger sucking new circular reactions involving the mouth. Thus from 0:2(18) Laurent plays with his saliva, letting it accumulate within his half-open lips and then abruptly swallowing it. About the same period he makes sucking-like movements, with or without putting out his tongue, changing in various ways the position of his lips, he bends and contracts his lower lip,etc. (p.51)

The processes of assimilation and accommodation are both active in the primary circular reaction. Assimilation exists because the behavior patterns are derived from already existent schemata.

> It is assimilation to the extent that it constitutes a functional use prolonging the assimilation reflex described in the first chapter: to suck thumb or tongue is to assimilate these objects to the very activity of sucking. (p.61)

Accommodation exists because a variation in the schemata is acquired and retained.

> ...circular reaction is accommodation to the extent that it realizes a new coordination, not given in the hereditary reflex mechanism. (p.61)

Occurring at about the same time as the primary circular reactions, there are behavior patterns in which accommodation is predominant. While the circular reaction is derived from the inborn activity patterns of

the infant, these other behavior patterns seem to derive more directly from the pressures exerted by the environment. Piaget discusses, in this regard, relationships that become established between nursing and the customary situations in which the infant nurses.

> It is certain that, at a given moment in development, relationships are established between the position of the child, tactile and acoustic signals, etc. and the release of sucking movements. (p.56)

Thus, the infant has established a relationship between certain signals and nursing behavior when, held in his mother's arms, he gives up sucking his fingers and seeks only to suck the breast.

Piaget rejects the explanation, proposed by others, that passive association or associative transfers account for the establishment of such relationships. Piaget (1952) suggests that the establishment of such relationships is not passive or mechanical.

> Through the constant seeking which characterizes the sucking instinct it is always in connection with the efforts and gropings of the subject himself that the association is acquired. (p.59)

Piaget (1952) suggests that postures, attitudes or other elements originating in the nursing situation but not, to begin with, essential to the schemata of nursing, are eventually assimilated to that schema.

> It is simply to say that the sucking schema - that is to say, the organized totality of the movements and attitudes peculiar to sucking - comprise certain postures which extend beyond the buccal sphere. Now these attitudes are not entirely passive and sooner or later involve the compliance of the whole body: the limbs become rigid, the hands clenched, etc., as soon as the nursling adopts the position characteristic of nursing, thenceforth the simple recall of these attitudes sets in motion the whole cycle of the sucking act because the kinesthetic sensations and postural sensibility thus released are immediately assimilated to the schema of this act. (p.59)

In these instances Piaget suggests the influence of the external environment appears greater than it is. The behavior patterns are actually learned only because they are assimilated to the behavior patterns of the hereditary reflex.

What occurs according to Piaget (1952) is "the constitution and progressive enlargement of a single schema of accommodation and assimilation combined. At most, can it be said, in such a case that accommodation prevails over assimilation." (p.59)

The development of intelligence is furthered still more by the coordination of schemata which originally exist independently of one another. Prior to

this development, coordination exists among schemata of a similar type but does not exist between schemata derived from different reflexes. Thus coordination may exist among visual schemata, or among sucking schemata but coordination between the schemata of vision and sucking does not exist.

Coordination among heterogenous schemata occurs at first by chance. Thus the child may look by chance at the source of the sound to which he is listening or he may grasp by chance that which appears in his visual field. The child's attempts to conserve such chance coordinations are an indication that the process of coordinating independent schemata is underway.

Like the developments that resulted in the acquisition of primary circular reactions the development of coordination among heterogenous schemata depends on the processes of assimilation and accommodation. In this case what is assimilated are not variations in specific schemata. Rather what occurs is the assimilation of schemata to one another.

The process by which schemata are assimilated to one another can be illustrated by a summary of Piaget's account of the steps leading to coordination between the primary schemata of vision and the movements of the hand, including prehension.

Prior to the development of this coordination progress occurs separately in the development of vision and in the development of hand movements. Piaget observes that for vision, as well as for hand movements there exists a reflex stage and a stage of primary circular reactions.

Following the stage of primary circular reactions occurring separately for visual and hand movements, the beginnings of coordination may be observed. As one example of this beginning coordination Piaget (1952) presents the following.

> Obs. 61 - Jacqueline seems not to have looked at her hands before 0:2(30). But on this date and the following days she frequently notices her moving fingers and looks at them attentively. At 0:3(13) she rumples her quilt with both hands. When her hands move into her visual field she looks fixedly at them just as she looks at the folds of the quilt when they appear before her but, if her eyes attempt

> to see the hands, the hand movements do not yet depend on vision at all. At 0;3(21) likewise, her eyes follow her hands. At 0;3(22) her glance follows her hands which turn aside and she seems very much surprised to see them reappear. (p.96)

About these beginning coordinations Piaget (1952) says

> the visual schemata tend to assimilate the manual schemata without the converse being yet true. In other words, the glance tries to follow what the hand does but the hand does not tend in any to realize what the glance sees; it does not even succeed in remaining in the visual field. (p.97)

Next, hand movements begin to be accommodated to vision,

> the act of looking at the hand seems to augment the hands activity or on the contrary to limit its displacements to the interior of the visual field. (p.102)

The coordination between vision and hand movements is not yet completed.

> ...the child still only grasps objects when he touches them by chance, and, if he looks at his hands when they are holding the object, vision does not yet help at all in the actual act of grasping. (p.109)

The next step in the development of coordination between vision and hand movements occurs when "there is prehension as soon as the child simultaneously perceives his hand and the desired object." In illustration of this Piaget (1952) offers the following observation.

> Lucienne, at 0;4(15) looks at a rattle with desire, but without extending her hand. I place the rattle near her right hand. As soon as Lucienne sees rattle and hand together, she moves her hand closer to the rattle and finally grasps it. A moment later she is engaged in looking at her hand. I then put the rattle aside. Lucienne looks at it, then directs her eyes to her hand, then to the rattle again, after which she slowly moves her hand toward the rattle. As soon as she touches it, there is an attempt to grasp it and finally, success. After this I remove the rattle. Lucienne then looks at her hand. I put the rattle aside. She looks alternately at her hand and at the rattle, then moves her hand. The latter happens to leave the visual field. Lucienne then grasps a coverlet which she moves toward her mouth. After this her hand goes away haphazardly. As soon as it reappears in the visual field, Lucienne stares at it and then immediately looks at the rattle which has remained motionless. She then looks alternately at hand and rattle after which her hand approaches and grasps it. (p.111)

Next, "the child grasps that which he sees without limitations relating to the position of the hand." (p.116) He also speaks of the possibility of an intermediary stage during which prehension occurs only when the hand is in the visual field but sight of the object tends to bring the hand into the visual field.

The development of the coordination between vision and prehension, outlined in the preceding pages is illustrative of the coordination Piaget also

describes as developing between other sensorimotor schemata. Thus, Piaget (1952) also follows in some detail, the development of coordination between vision and hearing, vision and sucking, sucking and grasping, and phonation and hearing.

According to Piaget a new totality is formed with the coordination of these heterogeneous schemata.

> there is neither association between two groups of images nor even association between two needs, but rather the formation of a new need and the organization of earlier needs as a function of this unity. (p.143)

In other words, when the intercoordination of schemata is accomplished there is created an overall organization which needs to function. This organization is derived from the original biologically based organization but in certain respects transcends it. Within this new overall organization individual schemata continue to differentiate. However continued differentiation of primary schemata, that is, the schemata of vision, sucking, grasping, etc., is interesting to the child at this stage only to the extent that coordination between newly differentiated schemata and the other schemata of assimilation can be established. That is, differentiation

of these schemata is interesting to the child at this stage because it allows him to exercise the intercoordination of schemata. Reciprocal assimilation then of differentiated schemata conserves the existing intercoordination of schemata as it extends and diversifies the organization constituted by this intercoordination.

It is the external object which at this stage generally provides the organism with opportunities for differentiation of schemata and the exercise of the intercoordination of schemata. Piaget observes that there is a change, with the achievement of the coordination of primary schemata, in the child's relation to the external world. The interest of the infant in the external object is now augmented by the fact that the object can be assimilated to several schemata simultaneously.

> It thus acquires an ensemble of meanings and consequently a consistency which endow it with interest. (p.121)

There is an advance, too, related to this, in the development in the infant of differentiation between subject and object. The infant's perception of the

object as existing independently of his /her own activity is facilitated by the fact that the object can now be assimilated to several schemata simultaneously.

The continuing intercoordination of primary schemata and of schemata derived from primary schemata leads the child not only to an increased interest in the external world but also, in the following stage to the realization of the relationship between his actions and their external consequences. With this realization comes the development of the secondary circular reaction.

> ...when Laurent unwittingly starts a movement of the toys by pulling a chain or rubs a paper knife against the wicker of his bassinet he is looking at, listening to, etc., the effort thus produced without trying to conserve it by other means. But precisely because he is in the act of shaking the chain or the paper knife while he looks at or listens to the result of these movements, the two kinds of schemata sooner or later end by being reciprocally assimilated...as soon as this reciprocal assimilation has been formed the child understands that the external results which he has observed (the movement of the toys or the sound of the paper knife against the wicker) depends upon his manual as well as his visual or auditory activity and this understanding, thereafter gives rise to an immediate circular reaction, that is to say, to an act of reproductive assimilation. (p.174)

Thus is the secondary circular reaction derived from the primary circular reactions and the intercoordinations of primary schemata. All secondary circular

reactions are derived from primary circular reactions and from the reciprocal assimilation of differentiated primary schemata. However, in the primary circular reaction the attention of the child is focused on his own actions rather than on their consequences in the external world. In the stage of the secondary circular reaction, the child's attention is directed to the external consequences of his actions.

> ...in the circular reactions which we call 'secondary' and which characterize the present stage, the movements are centered on a result produced in the external environment and the sole aim of the action is to maintain this result... (p.157)

As an example of the development of a secondary circular reaction Piaget provides the following observation.

> Obs. 94 - At 0;3(5) Lucienne shakes her bassinet by moving her legs violently (bending and unbending them, etc.), which makes the cloth dolls swing from the hood. Lucienne looks at them, smiling, and recommences at once. These movements are simply the concomitants of joy. When she experiences great pleasure Lucienne externalizes it in a total reaction including leg movements. As she often smiles at her knick-knacks she caused them to swing. But does she keep this up through consciously coordinated circular reaction or is it pleasure constantly springing up again that explains her behavior?

That evening, when Lucienne is quiet, I gently swing her dolls. The morning's reaction starts up again, but both interpretations remain possible.

The next day, at 0;3(6) I present the dolls: Lucienne immediately moves, shakes her legs, but this time without smiling. Her interest is intense and sustained and there also seems to be an intentional circular reaction.

At 0;3(8) I again find Lucienne swinging her dolls. An hour later I make them move slightly: Lucienne looks at them, smiles, stirs a little, then resumes looking at her hands as she was doing shortly before. A chance movement disturbs the dolls: Lucienne again looks at them and this time shakes herself with regularity. She stares at the dolls, barely smiles and moves her legs vigorously and thoroughly. At each moment she is distracted by her hands which pass again into the visual field: she examines them for a moment and then returns to the dolls. This time there is definite circular reaction.

At 0;3(13) Lucienne looks at her hand with more coordination than usually (see Obs. 67). In her joy at seeing her hand come and go between her face and the pillow, she shakes herself in front of this hand as when faced by the dolls. Now this reaction of shaking reminds her of the dolls which she looks at immediately after as though she foresaw their movement. She also looks at the bassinet hood which also moves. At certain times her glance oscillates between her hand, the hood, and the dolls. Then her attention attaches itself to the dolls which she then shakes with regularity.

At 0:3(16) as soon as I suspend the dolls she immediately shakes them, without smiling, with precise and rhythmical movements with quite an interval between shakes, as though she were studying the phenomenon. Success gradually causes her to

> smile. This time the circular reaction is indisputable. Same reaction at 0;3(24). Same observations during the succeeding months and until 0;6(10) and 0;7(27) at sight of a puppet and at 0;6(13) with a celluloid bird, etc. (pp.157-158)

Thus, Lucienne, in exercising a primary schema (moving her legs bending and unbending) becomes interested in the external result of her actions (the swinging of the dolls). At some point she realizes the connection between her own actions and the movement of the dolls. She attempts then to reproduce the external result, the movement of the dolls, rediscovering the actions which led to it. The essence of the secondary circular reaction lies in this, the efforts of the child to reproduce interesting and novel external phenomena by rediscovering and reproducing those of his actions which led to that phenomena.

The child's efforts during the stage of the secondary circular reaction, to reproduce interesting external phenomena, leads him or her to a fundamental developmental achievement. Through these efforts he begins to distinguish the means through which that interesting result was obtained and the interesting

result itself. This beginning differentiation of means and ends, according to Piaget, signals the advent of intentional behavior.

Thus, Piaget suggests that prior to this stage of secondary circular reaction, there is neither consciousness of intention or of the organization through which behavior is directed.

> the more the effect of reproduction bears upon results removed from those of reflex activity, the clearer becomes the distinction between means and ends...The repetition belonging to 'reflex use' would only know how to make the machine go by activating it completely without distinction between the transitive terms and the final terms. In the case of the first organic habits (thumb sucking, for example) the complexity of the schema augments since an acquired element is inserted among the reflex movements: repeating the interesting result therefore will involve a coordination between terms not necessarily united with each other. But, as their union, although an acquired one, was in a way imposed by the conformation of the body itself and sanctioned by a strengthening of reflex activity, it is still easy for the child to rediscover through simple repetition the result obtained without distinguishing the transitive terms and the final term of the act. pp.154-155)

The differentiation of means and ends, which for Piaget, is essential to intention and to intelligent behavior is an acquisition determined by the processes of adaptation and organization. It does not precede adaptation but arises from it.

Piaget acknowledges the difficulty of defining intention. He admits that, depending on the definition, some people might be inclined to attribute intention to behavior that exists prior to the stage of the secondary circular reaction while others would place the advent of intentional behavior at a later phase in development.

Piaget (1952), in deciding whether the behavior of a particular stage is or is not intentional considers the number of intermediary actions which intervene between the stimulus and the goal.

> ...we see only one method of distinguishing intentional adaptation from the simple circular reactions peculiar to sensorimotor habit: this is to invoke the number of intermediaries coming between the stimulus of the act and its result. (p. 147)

He cites as an example of intentional behavior

> ...when an eight month old child sets aside an obstacle in order to attain an objective, it is possible to call this intention, because the need set in motion by the stimulus of the act (by the object to be grasped) is only satisfied after a more or less lengthy series of intermediary acts (the obstacles to be set aside). Intention is thus determined by consciousness of desire, or of the direction of the act, this awareness being itself a function of the number of intermediary actions necessitated by the principal act. (p.148)

From this point of view the stage of secondary circular reaction is a transitional one. Intention develops only after the constitution of the circular reaction, that is, in the effort of reproduction. Only in later stages of development does consciousness of intention precede directed action. The process by which differentiation of means and ends is established begins in the stage of the secondary circular reaction but is completed only in later stages.

Progress in development, from this stage to the next, continues to occur through the processes of assimilation and accommodation in organization and adaptation.

Reproductive assimilation is evident in the behavior patterns of the secondary circular reactions. Recognitory assimilation and generalizing assimilation also continue to be operative at this stage.

The child at this stage may show recognition of an object by outlining the movements he customarily uses when confronted by that object. Contact with the object does not, in these cases, result in the full performance of the secondary circular reaction but rather an abbreviated version of that reaction.

> What happens, in effect, is that the child, confronted by objects or sights which habitually set in motion his secondary circular reaction, limits himself to outlining the customary movements instead of actually performing them. Everything takes place as though the child were satisfied to recognize these objects or sights and to make a note of this recognition, but could not recognize them except by working rather than thinking, the schema helpful to recognition. (p.185)

> From 0;7(27) certain too familiar situations no longer set in motion secondary circular reactions, but simply outlines of schemata. Thus when seeing a doll which she actually swung many times, Lucienne limits herself to opening and closing her hands or shaking her legs, but very briefly and without real effort. At 0;10(28) she is sitting in her bassinet. With my hand I slightly shake the whole apparatus by touching the handle. Lucienne laughs and responds by gently shaking her hand, but this is not an attempt to make me continue: it is only a sort of acknowledgment (p.186-187)

Generalizing assimilation occurs at this stage when the child meets new objects and utilizes them in his accustomed schemata.

> the child from the outset makes use of his usual behavior patterns and assimilates the unfamiliar to their schemata without adding anything...(p.196)

> ...the child at the present stage, while sometimes feeling surprise in the presence of an unknown object, nevertheless from the outset treats it as a familiar object and employs it in the use of his habitual schemata. (p.197)

Generalizing assimilation is also evident at this stage, in the procedures to make interesting spectacles last. In "the procedures to make interesting spectacles last" the child tries by utilizing his habitual schemas to prolong events which have not been caused by his actions.

> he looks at a tin box placed on a cushion in front of him, too remote to be grasped. I drum on it for a moment in a rhythm which makes him laugh and then present my hand (at a distance of 2 cm. from his, in front of him). He looks at it, but only for a moment, then turns toward the box; then he shakes his arm while staring at the box (then he draws himself up, strikes his coverlets, shakes his head, etc.; that is to say, he uses all the 'procedures' at his disposition). He obviously waits for the phenomenon to recur. (p.201)

Piaget suggests that these behavior patterns foretell those of the following stage because the schemata are applied not in their habitual circumstances but in new situations. The secondary circular reactions are applied, in these cases, not as means in its own reproduction, but as a means of reproducing events not originally associated with that schemata. However, there is no accommodation of the means to the end as there will be in the following stage.

The stage Piaget calls the stage of coordination of secondary schemata follows the stage of the secondary circular reaction. In this stage there is marked progress in the child's capacity to realize an end through means differentiated from that end. In the stage of the secondary circular reaction means and ends were contained in a single schema and were differentiated only in the child's attempts to reproduce that schema after it had once been executed. In this stage, means and ends are constituted from schemata formed independently of one another and capable of functioning separately.

In this stage, too, intention occurs prior to action. In order to realize that intention the child at this stage coordinates schemata in relationships of means to ends. This coordination comes into being when the child, intending to utilize a familiar schema, is confronted by factors which interfere with his putting into action that schema. For instance, an obstacle may separate the child from the object upon which he wishes to act. Alternatively the child

may not be able to put into action a familiar schema without utilizing an intermediate object. At this stage the child begins to be capable of maintaining his original objective while utilizing other familiar schemata as means of dealing with the interfering factors.

Piaget provides a number of observations in which independent schemata are coordinated in relationships of means to ends directed by intention.

> Laurent, at 0;6(1) tries to grasp a big piece of paper that I offer him and finally place on the hood of his bassinet (and on the string connecting the hood with the handle of the bassinet). Laurent begins by stretching out his hand: then as soon as the object is placed, he reacts as he always does in the presence of distant objectives: he shakes himself, waves his arms, etc. The desire to grasp the paper seems to inspire such reactions, as I regulated it by removing the objective from the hood for a few seconds in order to move it progressively closer and farther away. It is when the paper seems inaccessible to the hand alone that Laurent shakes himself. After having behaved thus for a moment, he seems to look for the string hanging from the hood, then pulls it harder and harder while staring at the paper. At the moment when this is ready to fall off the hood, Laurent lets go the string and reaches toward the objective of which he immediately takes possession. Several sequential attempts have yielded the same result. It goes without saying that it cannot be demonstrated that Laurent pulled the string in

> order to grasp the paper, but the whole behavior pattern gave me the impression of being performed with this end in view and of being perfectly coordinated.
>
> If such is the case, it can be asserted that the schema of "pulling the string" has momentarily served as means to attain the end assigned by the schema "grasping the objective." This of course does not mean that Laurent has foreseen the object's fall, nor that he has conceived of the string as its extension: He has simply utilized a familiar schema with a new intention, and this is what characterizes the behavior patterns of the fourth stage. (p.214)

Assimilation is multiple in the behavior patterns of this stage. There is assimilation of an object to the primary or intended schema, there is assimilation of another object to a transitional schema and there is assimilation of the transitional schema to the primary or intended schema. Reciprocal assimilation of schemata results in more complicated relationships between schemata than had previously occurred. Even in the stage when coordination of primary schemata was established coordination occurred in the contemplation of only one object at a time. In the present stage not only are independent schemata brought into relationship with one another but the objects included in those schemata are brought into relationship with one another.

Accommodation at this stage exists not only in the accommodation of schemata to objects. Accommodation exists also in the accommodation of transitional schema to the final objective.

> Obs. 123 - From 0;7(28) the transitional schema of 'pushing the obstacle away' is slightly differentiated in Laurent: instead of simply hitting the things which intercede between his hand and the objective, he has applied himself to pushing them away or even to displacing them.
>
> For example at 0;7(28) I present to him a little bell 5 cm. behind the corner of a cushion. Laurent then strikes the cushion, as previously, but then depresses it with one hand while he grasps the objective with the other. Same reaction with my hand.
>
> At 0;7(29) he immediately depresses the cushion with his left hand in order to reach the box with his right. He does the same at 0;8(1): when my hand intervenes as the obstacle I definitely feel that he depresses it and pushes harder and harder to overcome my resistance. (pp. 218-219)

Thus the schema of striking objects is differentiated by Laurent to pushing them in order to make them go away.

The coordinations established between schemata at this stage are variable. The schemata are capable of being dissociated and regrouped in different combinations. In other words, actions are coordinated with other actions in differing combinations. However, the behavior

of the child at this stage is less advanced than it will be in the following stage. The child continues to act in order to utilize familiar schemata. The child's intent is to utilize familiar schemata and other familiar schemata are also utilized as the mean by which the child realizes that intent. Although schemata continue to be differentiated through assimilation and accommodation it is primarily the coordinations between schemata which are new at this stage.

The stage which follows the coordination of secondary schemata is the stage of the tertiary circular reaction. In this stage, there is, according to Piaget, a search for novelty as such. No longer does the child seek only to reproduce that which he has already experienced fortuitously. Now the child seems to seek novel experiences for their own sake. Further progress in the differentiation of subject and object occurs as the child attempts to find out in what way the object or event is new or different from those objects or events he has already experienced. In this stage the child does not only try to fit new objects

or events into already familiar schemata. He deliberately sets out to fit his schemata to the objects experienced.

Piaget provides a number of examples of tertiary circular reaction. I quote just one of his examples here.

> One recalls (Obs. 140) how, at 0;10(2) Laurent discovered in 'exploring' a case of soap, the possibility of throwing this object and letting it fall. Now, what interested him at first was not the objective phenomenon of the fall - that is to say, the object's trajectory - but the very act of letting go. He therefore limited himself, at the beginning merely to reproducing the result observed fortuitously, which still constitutes a 'secondary' reaction, 'derived,' it is true, but of typical structure.
>
> On the other hand, at 0;10(10) the reaction changes and becomes 'tertiary.' That day Laurent manipulates a small piece of bread (without any alimentary interest: he has never eaten any has no thought of tasting it) and lets it go continually. He even breaks off fragments which he lets drop. Now, in contradistinction to what has happened on the preceding days, he pays no attention to the act of letting go whereas he watches with great interest the body in motion; in particular he looks at it for a long time when it has fallen, and picks it up when he can.
>
> At 0;10(11) Laurent is lying on his back but nevertheless resumes his experiments of the day before. He grasps in succession a celluloid swan,

> a box, etc., stretches out his arm and lets them fall. He distinctly varies the positions of the fall. Sometimes he stretches out his arm vertically, sometimes he holds it obliquely, in front of or behind his eyes, etc. When the object falls in a new position (for example on his pillow), he lets it fall two or three times more on the same place, as though to study the spatial relation; then he modifies the situation. At a certain moment the swan falls near his mouth; now, he does not suck it (even though this object habitually serves this purpose), but drops it three times more while merely making the gesture of opening his mouth. (pp.268-269)

As objects and events acquire substantiality that is, as they acquire more complex meaning, due to the increasing complexity of assimilation the child discovers that certain aspects of the object or event cannot be assimilated to his existing schemata. Rather than disregarding these aspects or turning to objects or events more easily assimilated, the child at this stage deliberately seeks to vary his schemata in order to understand the resistances offered by these objects or events to assimilation.

Furthermore the child at this stage is not limited as he was in the previous stage, to utilizing familiar schemata in order to attain his objective. When confronted with factors which interfere with his

intentions in situations in which familiar schemata are not effective as means of dealing with those factors the child will seek new means. The discovery of these means is, of course, based on already established schemata. However accommodation of schemata to new situations is more systematic than it was at previous stages. The child makes use of the experimental behavior apparent in the tertiary circular reaction in order to find new means that is, he varies and gradates his actions according to the results obtained. However he does so now with the purpose of obtaining an objective by the adaptation of his schemata to a new situation.

> Obs. 162 - At 1;3(12) Jacqueline is seated in her playpen, that is to say, in a square enclosure whose four sides are formed by vertical bars connected at base and summit by a horizontal bar. The bars are 6 cm. apart. I place outside the pen, parallel to the side where Jacqueline is, a stick 20 cm. long which takes up the distance of about 3 spaces between the bars. We shall call these three spaces a, b, and c, space b corresponding to the middle part of the stick and spaces a and c to the end parts. The problem is to transfer this stick from outside to inside the pen.
>
> 1. Jacqueline begins by grasping the stick through space b, she raises it along the bars but holds it horizontally and parallel to the frame so that the

the harder she pulls the less it moves. She then extends her other hand through c, but holds the stick horizontally and does not succeed in making it come through. She finally lets go of the object which I put back in its initial position.

2. Jacqueline at once begins over again, by again grasping the stick at c. But, in raising it, she tilts it up a little, by chance, and so makes it slightly oblique. She immediately takes advantage of what she perceives and, passing her hand through c, she tilts the stick until it is sufficiently vertical to pass through. She then brings it into the pen through b. - Why did she tilt it up? Was it through foresight or did she simply extend the movement which was due to chance so as to see what would happen? The rest of these attempts rather substantiate this second interpretation.

3-4. This time Jacqueline grasps the stick through space c, that is to say, at one of its ends (doubtless because she tilted it up at c during the preceding attempt). She draws it horizontally against the bars but encountering resistance from them she quickly makes it vertical and pulls it through without difficulty. The speed of this adaptation is due to the fact that the stick was grasped by one of its ends; the subsequent attempts show that nothing systematic yet exists.

5. Jacqueline again grasps the stick by the middle at b. She raises it, puts it horizontally against the bars, as in 1. She pulls and seems very surprised by her failure. It is only after a while that she tilts it up (this time, it appears, intentionally) and succeeds in bringing it in.

6-10. Same reactions. At each new attempt, she begins by trying to make it penetrate horizontally, parallel to the frame. It is only after this

preliminary failure that she tilts up the stick, still quite slowly.

11. This time Jacqueline turns the stick more rapidly because she grasped it at c.

12-15. She again grasps it at b and recommences to try to bring it through horizontally, as 5-10. Then she tilts it up, more slowly than in 11, and succeeds.

16. She continues to take it at b and to try to pull it through horizontally, but this time she does not persist and tilts it up immediately.

17. For the first time Jacqueline tilts the stick before it touched the bars and no longer tries to bring it in horizontally. However, she grasped it at the middle (at b).

18-19. She again begins by trying to bring it through horizontally but it seems that this was due to automatism and she tilts it up immediately afterwards.

20 et seq. She finally turns it systematically before it touches the bars. (see 17) (pp.305-306)

The invention or more accurately, the discovery of new means that occurs in the fifth stage, is invention or discovery that occurs in action. In the sixth stage and the final stage detailed in the Origins of Intelligence, invention occurs through deduction or mental combination. Piaget calls this stage the stage of the Invention of New Means through Mental Combination and Deduction. The reciprocal assimilation of schemata

that resulted in the coordination of transitional schemata to final schemata was in the fifth stage, apparent to the observer. In the fifth stage, too, accommodation of transitional to final schemata was evident to the observer and could be characterized as groping behavior. By the sixth stage the coordination of schemata to one another is more advanced and reorganization of schemata in relationship to one another and the accommodation of schemata to new situation occurs more rapidly and is not evident to the observer. Problems that might have been solved in the fifth stage, through experimentation in action are now solved through mental combination and deduction. Piaget contrasts Lucienne's behavior with the sticks with the experiments in action performed by Jacqueline during the fifth stage. Jacqueline's behavior was actively groping. Lucienne finds the solution easily.

> Obs. 178 - We recall Jacqueline's gropings at 1;3(12) when confronted by a stick to be brought through the bars of her playpen (Obs.162). Now it happens that the same problem presented to Lucienne at 1;1(18) gives rise to an almost immediate solution in which invention surpasses groping. Lucienne is

seated in front of the bars and I place against them, horizontally and parallel to the bars (half way up them) the stick of Observation 162. Lucienne grasps it at the middle and merely pulls it. Noticing her failure, she withdraws the stick, tilts it up and brings it through easily.

I then place the stick on the floor. Instead of raising it to pull it directly, she grasps it by the middle, tilts it up beforehand and presses it. Or else she grasps it by one end and brings it in easily.

I start all over again with a longer stick (30 cm. long). Either she grasps it by the middle and tilts it up before pulling it, or else she brings it in by pulling on one end.

Same experiment with a stick 50 cm. long. The procedure is obviously the same but, when the stick gets caught, she pulls it away briefly, then lets it go with a groan and begins over again in a better way.

The next day, at 1;1(19), same experiments. Lucienne begins by merely pulling (once), then tilts up the stick and so rediscovers the procedures of the day before. At 1:2(7) I resume the observation. This time Lucienne tilts up the stick before it touches the bars.

It may thus be seen how these attempts are reminiscent of Jacqueline's taking place through groping and apprenticeship. Lucienne begins by merely pulling the stick and repeats this once the next day. But, in contrast to her sister's prolonged efforts, Lucienne at once profits from her failure and uses a procedure which she invents right away through simple representation. (p.336)

Piaget cautions that, although the resolution of the problem seems spontaneous, the processes through which the problem is solved are not different than in previous stages. Assimilation, accommodation and reciprocal assimilation and accommodation are as essential in mental deduction as they are in sensorimotor experience.

According to Piaget also, the advance from the fifth stage to the sixth is as determined by these processes as the advances of earlier stages. Thus it is progress in the differentiation of schemata through assimilation and accommodation and progress in the intercoordination of schemata that leads the child to develop the capacity to intercoordinate schemata internally according to the needs of the situations in which he finds himself.

Mental representation, another achievement of this stage and an achievement implied in the capacity for mental combination and deduction, also develops as a result of assimilation and accommodation and the intercoordination of schemata. Thus the traces laid down

by perception can function as symbols only when through the intercoordination of schemata perceptual traces are linked to motor schemata and thereby acquire meaning.

Conclusion

To summarize this discussion of sensorimotor stages it may be said that these stages begin with the activities of specific hereditary reflexes. The patterns of activity which constitute the reflexes are diversified, then, as the reflexes function in the interactions of the organism with its environment. Functional assimilation, generalizing assimilation and recognitory assimilation are involved in this diversification of reflex functioning, as is accommodation. Gradually, through these processes, schemata which reflect departures from reflex functioning are established and conserved.

As development proceeds schemata begin to be coordinated with one another. A new organization is created with the intercoordination of schemata, which in some respects transcends the original biological organization. This organization, constituted as an

intercoordination of schemata, is itself extended and diversified. there is a change in the child's relationship to the external world which occurs with the coordination of primary schema. The external world is invested with greater meaning because the object can be assimilated to several schemata simultaneously and there is an advance in the differentiation of subject and object.

The child's interest in the external world is further boosted in the stage of the secondary circular reaction. In this stage the child begins to realize the connections between his own actions and their consequences in the external world. The child then attempts to reproduce interesting and novel external phenomena by rediscovering and reproducing those of his own actions which led to these phenomena. The child begins to distinguish the means through which the phenomena were obtained and the phenomena themselves. However, intention, at this stage, develops only after the constitution of the circular reaction, that is, in the effort at reproduction.

In the next stage, the stage of the coordination of secondary schemata, means and ends are constituted from schemata formed independently of one another and capable of functioning separately. Intention, at this stage occurs prior to action and the coordinations established between schemata are variable. The schemata at this stage are capable of being dissociated and regrouped in different combinations.

In the following stage, the stage of the tertiary circular reaction, the child no longer seeks to reproduce only that which he has already experienced fortuitously. Now the child seems to seek novel experiences for their own sake. During this stage too, when the child has not been successful in attaining his objectives through the use of familiar schemata he will seek to develop new means. However the invention or discovery of new means that occurs in this state is invention or discovery that occurs in action, rather than through mentation.

By the sixth stage, the coordination of schemata to one another is more advanced and reorganization of schemata in relationship to one another and the accommodation of schemata to new situations occurs more regularly and is not evident to the observer. Problems that might have been solved, in the fifth stage, through experimentation in action are now solved through mental combination and deduction.

Before concluding, I would like to point out that Piaget repeatedly called attention to the conservation of the early stages with respect to the later and to the relative sophistication of the later stages with respect to the earlier. He also repeatedly emphasized the invariance in functioning of organization and adaptation despite the changing organization in which these functions operate.

However, Piaget also contended that structure is realized only in functioning. If this contention is accepted the question of what is variable and what is invariable in functioning and in development becomes more troublesome. It may not always be easy, then, to determine what constitutes an enhancement of functioning and

what constitutes a complication of the structure in which that function operates.

It is with some risk, then, that one assumes that what is realized in functioning on a higher level of development provides some indication of what occurs on a lower level.

With some recognition of this risk I make the proposal that there occurs on the instinctual level, a progressive complication of relationships between instinctual schemata, comparable in some respects to the progressive complication of relationships between schemata occurring over time in development.

I make this proposal in the hope that it will enable me to clarify, in the following chapter, the relationship between different types of motives.

I would like to propose additionally, that this progressive complication of relationships between schemata on the instinctual level is followed by a dissolution of those relationships between schemata established in the progressive complication. Encompassed in this cycle, then, are dissociations and regroupings

of schemata which, while differing in some respects from the dissociations and regroupings in later cognitive development are also in some respects similar to those.

I will not elaborate on this proposal here. I will, instead, incorporate it in the integration of psychoanalytic and Piagetian thinking that follows in the next chapter. However I will mention that the progressive complication of relationships between schemata which occurs with the advance of development is elaborated in accordance with variations in the external invironment and reflects the intellectual adaptation of the organism to its invironment. In contrast the progressive complication of relationships and the subsequent dissociation of schemata which I am suggesting, occurs on the instinctual level serves, I think, primarily to affirm biologically based interrelationship of schemata to one another. While it may reflect a phylogenetically established disposition for adaptation, it does not reflect an adaptation to a specific environment.

In conclusion I would like to say that the reader may have realized in perusing this chapter, that the elaboration of Klein's work which I presented in the previous chapter originated in my understanding of Piaget's work.

Conversely, my interpretation of Piaget's work has been enriched by my understanding of the work of Klein and of other psychoanalytic theoreticians.

In the following and final chapter I will attempt to present a point of view which encompasses psychoanalytic concepts of motivation as well as Piagetian concepts of development.

CHAPTER V

MOTIVATION AND STRUCTURE IN PIAGET AND PSYCHOANALYSIS: AN INTEGRATIVE ATTEMPT

I began this work with the observation that Peter Wolff's attempts to integrate psychoanalytic and Piagetian thinking had been hindered by the fact that he depended on the energic model for his formulations of psychoanalytic motivational concepts. I presented then a summary of criticisms of the energic model put forth by a variety of psychoanalytic theoreticians.

I then reviewed the basic precepts of an alternative model of motivation. I suggested that this model, which had been developed by George Klein (1967), might, with some elaboration, serve as a framework within which psychoanalytic motivational concepts and Piaget's developmental concepts might be formulated in terms compatible with both Piagetian and psychoanalytic theory.

I went on, in the third chapter, to a discussion of Piaget's work in the Origins of Intelligence (Piaget, 1952)

To remind the readers of Piaget's work and Klein's word, before proceeding with my integrative effort, I will very briefly summarize the chapters on Klein and on Piaget.

In reviewing Klein's work I reported that Klein assumed that thinking is intrinsic in motivation. Beginning with this assumption Klein defined what he called a structures affecto-motor train of thought and proposed that the direction of intensity of motivation were determined by certain aspects of these trains of thoughts. Klein conceived of these trains of thoughts as cycles, which were initiated with the excitation of a region of imbalance and closed with the termination of that excitation. Klein assumed that the termination of excitation did not necessarily correspond to a reduction in stimulation. He thought of terminal stimulation as balancing, rather than tension reducing, and suggested that termination of a train of thought might occur with an increase or with a decrease in stimulation.

Direction of thought, Klein suggested, is given by the fact that only by termination of excitation at the primary region of imbalance is a cycle completed. Intensity is given by the "the number, persistence and unrelieved repetitiveness - of events at the region of imbalance." (Klein, 1967, p.92)

Intensity of motivation may be influenced by a number of factors. Insufficient feedback to the region of imbalance may contribute to intensity. The complexity of imbalance, in Klein's words, "the variety of converging qualitatively distinct events that comprise a region of imbalance," (Klein, 1967, p.102) may also contribute to intensity. Finally, interference with terminal feedback to the region of imbalance may contribute to intensity.

In reviewing Klein's work I suggested that he had not accounted for some essential premises in the psychoanalytic theory of motivation and I proposed to account for these by an elaboration of the framework he provided, and by an integration of his concepts with those of Piaget.

In modifying his framework I suggested that complexity of imbalance had biological as well as experential determinants. I proposed that there existed a biological network within which sequences of events occur and suggested that the composition of this network made certain relationships between events more likely than others. In elaborating I suggested that the pathways, within this network, through which inhibitory, priming or facilitating signals are transmitted are variably distributed. For certain elements and systems of elements, the pathways through which such linkages occur, are more numerous and varied than for other elements and systems of elements. I assumed that the potential complexity of imbalance increased the more numerous and varied these pathways.

I also defined a self-reactivating train of thought as one in which the various steps in the sequence of events lead recurrently to one another. I suggested that such sequences are not indefinitely self-reactivating but that they arise and are terminated in the context of other sequences of events.

I suggested, too, that imbalance corresponds to a particular ordering or arrangement of elements in organization as well as to the excitation of a specific bodily zone and can be corrected only with a reordering of those elements. In a self-reactivating cycle, I said, successive reorderings of elements in organization led recurrently to the order with which the cycle began.

Piaget (1952) began the Origins of Intelligence with an assumption that "the organism is a cycle of physicochemical and kinetic processes which, in constant relation to the environment, are engendered by each other." (p.5)

Piaget assumed also that the functions of organization and adaptation are operative at all levels of behavior, including the intellectual and the strictly biological. Adaptation and organization are inter-dependent, he suggested. Furthermore, adaptation, which is accomplished through the processes of assimilation and accommodation, always occurs in the context of existing organization. It is through assimilation that

organization is conserved even as it is modified. It is through accommodation that organization is modified even as it is conserved.

I suggested that implicit in Piaget's notion of a schema is the idea that relationships between elements in organization vary with the progress of the cycle that is the schema. What followed from this, I said, was the idea that adaptive modifications occur in an organization that already encompasses variation. What is modified, then, with the modification of schemata in adaptation, is not an unchanging organization, but a cyclically varying pattern of interrelationships that exists as the expression of organization.

I reported also that Piaget assumed an equilibration process occurred in organization as well as in adaptation. According to him the organism's attempts to modify its structure are always balanced by its attempts to conserve already established structure. Implicit in the idea that equilibration occurs in organization as well as adaptation, I suggested, is the idea that equilibration occurs on several levels

simultaneously. Equilibration occurs in the recurrent reorganization of elements in relationship to one another that occur with the advance of the individual schema. Equilibration occurs also in the recurrent reorganization of relationships between individual schema as they function in relationship to one another. Equilibration also occurs as schemata are enacted in the organism's interrelationships with its environment. No permanent state of equilibrium is ever achieved.

Finally, I reviewed the stages of development discussed by Piaget, and proposed that there occurred on the instinctual level a progressive complication of relationships between instinctual schemata, comparable in some respects to the progressive complication of relationships between schemata occurring over time in development.

While I have already made some attempt to account for psychoanalytic motivational concepts in terms of Klein's model, I have not yet demonstrated the compatibility of Klein's work with Piaget's nor

shown how a Piagetian perspective can enrich psychoanalytic motivational concepts.

As a preliminary to the presentation of view of motivation, which I think, encompasses the developmental concepts of Piaget and the motivational concepts of psychoanalysis I would like to demonstrate the correspondence between the Piagetian concept of schema and the concept of a self-reactivating train of thought.

Consider again Piaget's abstract definition of the schema of assimilation

(1) $a + x \longrightarrow b$;

(2) $b + y \longrightarrow c$;

(3) $c + z \longrightarrow a$, etc. (1952, p.5)

Let us assume that a defines a situation which includes as one of its aspects particular thresholds to stimulation at a region subject to imbalance.

For example, if a corresponds to bodily movements or to particular components of bodily

movements, let us assume that these movements or component movements are coordinated with particular threshold levels at the region of potential imbalance.

Let us further assume that given the situation a, x is an effective stimulus. The addition of x to the situation leads to the next step in the progression of events in the structured affective-cognitive motor train of thought.

We might speculate that each step in the progression of events is linked to changes at the primary region of imbalance. It is possible that at different points in the sequence of events, either different levels of stimulation or different kinds of stimulation might be effective in determining the further progression of events.

Thus, with the progression of events to b, x might no longer be an effective stimulus or an effective level of stimulus for progression to the next step. Instead y is now effective.

The train of thought can be considered closed when conditions for its reactivation are fulfilled - that is, with a return to the situation a with which the sequence began.

Piaget also outlines abstractly the situation in which there is a change in the elements of the environment and thus a change in the stimulus to which the person is exposed.

(1) $a + x^1 \longrightarrow b^1$;

(2) $b^1 + y \longrightarrow c$;

(3) $c + z \longrightarrow a$. (1952, p.6)

For my purposes at this point it is enough to say that despite the variation in environmental stimulus there is a return in the cycle to the point of departure, allowing the chain of events to begin again.

In both cases the Piagetian concept of schema can be defined as a structured train of events in which the closing of the sequence of events leads to its reactivation. The schema and the self-reactivating train of events, then, are conceptual correlates. In other words the terms schema and self-reactivating train of events have the same meaning, though they originate in different theoretical contexts.

In the next few pages, I will attempt to account in terms compatible with Klein and with Piaget, for the recurrent intensification of instinctual motives, for the autonomous quality associated with such motives and for the predominance of sexual motives in the heirarchy of human motives. I will also attempt to account for the variability in the hierarchy of motives and for the factors of quality of intensity associated with the emergence and satisfaction or frustration of motives.

What follows is the presentation of a body of assumptions. Some of these assumptions originate with Klein (1967) and some with Piaget (1952), and have been discussed in the preceding chapters. Other assumptions originate in my present effort to integrate psychoanalytic and Piagetian concepts and to order the assumptions of each theory in relationship to the assumptions of the other.

For clarity of presentation I will present the assumptions in relationship to one another without giving any further recounting of the origins of each assumption.

Integration

In the human organism there is continuity of functioning. Thus, individual schema exist in relationship to one another within an overall schema and a schema itself is a cycle of operations, each operation engendered in relationship to the others. Schemata are, at first, evidenced in behavior as patterns of actions. Sensorimotor schemata include the schemata of sucking, of prehension, of vision and of phonation. Later action schemata are internalized, constituting the operations of thought.

Underlying the system of schemata operating in relationship to one another is a network in which elements are linked in potential relationship with one another. This network is at first determined by biological structure, though there is a later elaboration of it in development. Potential relationships in the network are made actual as its elements are linked in successive and varying patterns of interrelationship, making up sequences of events which are manifested as schema.

There are temporal boundaries, based on the relationship of cycles to one another, within which the repetition of any given cycle of operations or the repetition of any operation within that cycle is equilibrating and beyond which it is disequilibrating.

Disequilibrium, or imbalance, then is inevitable in any particular ordering of elements in organization. Disequilibrium, moreover, is specific rather than general and always corresponds to a particular arrangement of elements in organization. Imbalance can be corrected only with a rearrangement or reordering of those relationships, although reordering does not necessarily lead to correction of imbalance. As the successive patterns of interrelationship constituting schemata, and constituting the interrelationship of schemata, are realized shifts in the locus and definition of imbalance occur. These shifts, then are linked to a reordering of relationships which may correct a specific imbalance but which leads inevitably to the emergence of imbalance in a different form.

Although I have not yet mentioned the relationship of pleasure and unpleasure to the functioning of schema in relationship to one another, Jacobson's

comments on pleasure and unpleasure may be of some interest here

> ...we need not necessarily, wish indefinitely to maintain a specific pleasure...the urge for a change arising in a pleasurable situation might refer to a wish either for more intense pleasure or for a different quality of pleasure...Wishing would always be wishing for pleasure, but it would represent a striving for cycles of pleasure having different qualities...cycles corresponding to our biological existence and rooted in our instinctual life... (Jacobson, 1971, pp.26-27)

Although the notion of a schema implies regularly occurring and recurrent variations in the patterns of interrelationships of elements in organization, there may be a considerable difference, for different schema, in the degree of regularity and recurrence which characterize functioning. The pattern of variation in the interrelationships of elements which constitute schema may be relatively disordered or rather inflexibly fixed. For instance, in early infancy, the schema associated with hand and arm movements appear relatively disordered while the schema associated with sucking appear relatively ordered.

According to Piaget (1952), "Prehension does not from the outset lend itself to systematic use as does sucking." (p.89)

The extent to which any schema or cycle of events is complete in itself is the extent to which by virtue of order in the interrelationship of elements comprising it, successive patterns of interrelationship lead regularly and recurrently to one another. The more regular and recurrent the patterns of variation, the more directed will behavior be. Directedness in no way implies intention, either conscious or unconscious. The question of the relationship between direction and intention, though important, will not be addressed here. Intention implies representation of some sort and the study of the development of representation is a task in itself.

Returning to the present task, then, it can be said that no cycle of events, however well ordered, is ever really complete in itself. Totality is always relative and directed behavior always occurs in a context. Even the functioning of the well ordered schema is modified as it is enacted in varying interrelationship

with other schema and with the environment. Thus the reordering through which successive equilibration occurs in the individual may be modified in accordance with the reorderings through which successive equilibration occurs in the relationship between schema and in accordance with the reordering through which successive equilibrium occurs in the relationship between the organism and the environment.

Thus the schema of sucking may be modified as it is enacted in interrelationship with the schema of swallowing as in nursing, or it may be modified as it incorporates a variety of external objects into its functioning.

Disequilibrium arises and may be corrected in the individual schema, in the interrelationship between schema and in the interrelationship of the organism and the environment. Disequilibrium may arise on one level and be corrected in another. For instance, disequilibrium arising in the interrelationship between parent and child might be corrected by a reordering in the child's thinking. Thus the disequilibrating effects of critical remarks by a parent might be corrected by the child's

revival of memories of loving kindness bestowed by that same parent and the revision in thinking of the actions towards which parental criticism was directed.

Disequilibrium of any specific locus and definition is more or less likely to occur depending on some characteristics of the network which underlies the system of schemata. A mapping out of this network would indicate that there was some variety in the kind and number of pathways existing between elements and systems of elements. As I stated in the chapter on Klein, these pathways through which inhibitory, priming and facilitating signals are transmitted are variably distributed in the network.

The potential complexity of imbalance, and therefore the potential quality and intensity of motivation, varies according to the richness and complexity of potential connections between systems of elements corresponding to one region and systems of elements corresponding to other regions.

Within the context of the network I have described what is at one moment a primary region of imbalance is at another a region with potential but not

actual imbalance. The likelihood of imbalance or the potential for imbalance is greater at some locations rather than others.

It may be useful to think of the total network as comprised of central and subordinate networks.

In the central network the potential complexity of imbalance is greater because the linkages between the central network and the subsidiary network are greater than the linkages in the subsidiary network to one another.

As elements in the subsidiary networks are linked in varying patterns of interrelationship with one another schemata are generated. These subsidiary schemata exist in varying relationship with other subsidiary schemata.

The varying relationships between subsidiary schemata exist within an overall cycle of operations. I would like to suggest that as this overall cycle progresses there is an increasing complication of relationships between the cycles comprising it.

As the subsidiary cycles are linked in varying patterns of interrelationship with one another, corresponding elements in the central network are also linked in varying patterns of interrelationship. Disequilibrium in the central network varies as the order or arrangement of subsidiary cycles in relationship to one another varies. With the increasing complication of relationships between subsidiary cycles disequilibrium in the central network becomes more complex and motivation more intense.

At some point disequilibrium at the central region leads to the triggering of a central cycle of events which results in a reordering of relationships such that there is a dissolution of the complicated interrelationships which led to that triggering and the establishment of a different ordering of elements in relationship to one another. The cycle following that dissolution and reordering, continues with subsidiary cycles operating at first in relative independence from one another and from the central cycle.

However, as the cycle progresses again, the priming of systems of elements by the functioning of other systems, eventually leads again to the complication

of interrelationships between subsidiary systems and the consequent priming and triggering of the central system.

One can assume that there are a variety of cycles operating in the human organism in which the complication of interrelationships between subsidiary cycles leads not only to the triggering of a central schema but also, as a consequence of that triggering and the cycle of events which proceeds from it, to a reduction in the very complication of interrelationships which led to that triggering.

One can assume, for instance, that such a cycle exists in the relationship of pregenital to genital schema. Thus as sequences associated with subsidiary erotogenic zones are activated there is an increasing complication of relationships between sequences of events associated with subsidiary schema and a corresponding priming of sequences associated with a central erotogenic zone. In other words as excitation arises in oral, anal and other subsidiary erotogenic zones there is an increasing complication of relationships between sequences of events associated with such zones

and a corresponding excitation of the central or genital erotogenic zone, even if no direct stimulation of that zone occurs. With the triggering of the central schema there is a dissolution of complication and a reordering of the relationships of subsidiary schema to one another and to the central schema. The cycles, associated with the various erotogenic zones, operate for a time, then in relative independence from one another.

In the immature organism, on the other hand, the schema associated with pregenital erotogenic zones can be characterized as central. This assumes that many, although not all of the activities which in traditional psychoanalytic thinking comprise the ego, originally exist in a subsidiary relationship to the schemata of the erotogenic zones. The schemata which function with the activation of the erotogenic zones are highly ordered relative to the schema which function with the activation of some other zones. It does not follow that the erotogenic schema are the only highly ordered or even the most highly ordered of biological schema. There may be highly ordered schema which exist in relative independence from the erotogenic schema and from other biological schema. Thus the regularity and

recurrence of erotogenic schemata does not alone determine their centrality. The centrality of these schemata derives as well from the characteristics of the network in which they are generated. Thus the network corresponding to the erotogenic zones is assumed to be richly interconnected with other networks.

Thus a cycle is assumed to exist in which the activation of schemata, such as those of motility and prehension, leads through the complication of interrelationships of the sequences of events comprising those schemata to the activation of the erotogenic zone central to a particular phase of development. The activation of the central schema then leads to the hierarchical ordering of subsidiary schema in relationship to central schema and a reordering of the relationship of subsidiary cycles to one another, corresponding to a reduction in complication of interrelationships.

It can be assumed, too, that the complication of relationships between subsidiary sequences of events occurs more quickly the less ordered the subsidiary sequences involved in that complication. Thus complication of relationships between subsidiary schema and

triggering of central schema occurs more precipitously the less mature the organism.

As the organism matures there is an elaboration of subsidiary schema and an elaboration of the interrelationships between subsidiary schema. This elaboration encompasses an ordering of the pattern of variations which constitute those schema and an ordering of the pattern of variations which constitute their interrelationships of subsidiary schema. The more ordered the pattern of variations in subsidiary schema the less quickly or the less precipitously the triggering of central schema occurs.

As subsidiary schema are ordered and elaborated in the developmental process it becomes more possible to correct imbalance arising with the functioning of subsidiary schema by varying subsidiary schematic functioning. It becomes less necessary to correct imbalance arising as these schemata function through the reordering of subsidiary schema in relationship to one another, which occurs with the functioning of the central schema.

Development, from this perspective, consists in the elaboration of alternative means for correcting disequilibrium arising with the functioning of the organism. Alternative means for correcting imbalance are constructed as less ordered schemata are ordered as they are enacted in relationship to other more ordered schema and, also, as they are enacted in relationship to an ordered environment.

Alternative means of correcting imbalance are also developed as well-ordered schema are varied s they are enacted in relationship to other schemata and as they are enacted in relationship to an ordered but varying environment.

The organism develops then as it varies and conserves already established orderings of elements in organization and as it establishes and conserves novel orderings of elements in organization. In other words development proceeds through assimilation and accommodation.

I will now try to relate all of this to pleasure and unpleasure. It is here assumed that the

quality and intensity of pleasure and unpleasure varies with the reordering of elements which occur as cycles progress and with the shifts between equilibrium and disequilibrium which occur with that progression. Pleasure is associated with the correction of imbalance or with the transition from disequilibrium to equilibrium and unpleasure with the emergence of imbalance or the transition from equilibrium to disequilibrium.

The quality and the intensity of pleasure and of unpleasure then, are interrelated. Quality is determined by the specifics of the reordering which occurs with transition from equilibrium to disequilibrium and vice versa and intensity by the comprehensiveness of the interrelationships involved in that reordering.

Thus the quality and intensity of pleasure and of unpleasure vary as schema are actualized in a varying environment in varying interrelationship with other schemata.

With the progressive complication of relationships between subsidiary schemata leading to the

triggering of a central schema there is also a progressive intensification of affect, which may be pleasureable or unpleasurable.

The intensification of affect will be pleasurable to the extent that the complication of relationships between schemata leading to the triggering of central schema is ordered. The intensification of affect will be unpleasurable to the extent that the complication of relationships leading to the triggering of the central schema is unordered.

Disequilibrium in the central network will increase with the increasing complication of relationships between schemata, whether that complication is ordered or unordered. What will be effected by the factor of order in the interrelationships of subsidiary schema, is the rapidity with which disequilibrium is generated in that central network. The more ordered the interrelationships of subsidiary schema, the less rapidly will disequilibrium increase. In other words priming of the elements associated with the central schema occurs at a lower level the more ordered the interrelationships between subsidiary schema.

However, the relationships between pleasure and unpleasure are complicated by the fact that equilibration occurs on several levels simultaneously. These relationships are also complicated by the fact that the emergence of disequilibrium in one system may be correlated with, and indeed may even be a consequence of the correction of equilibration in another system. It is also important to remember, in considering the relationships between degrees of order and pleasure and unpleasure, that repetition is not necessarily an indication of relatively high order. Repetition may give rise to disequilibrium insofar as repetition disrupts innate or previously established patterns of variability or tendencies toward variation in the organism.

I have here presented a model of motivation compatible, I think, with a psychoanalytic as well as a Piagetian perspective. I suggested earlier that I would attempt to account for recurrent intensification of motive pressure, the autonomous quality attributed to instinctive motives, variability of motivational

hierarchy, pleasure and unpleasure and the primacy of sexual (instinctual) motives.

In the model I present here, the cyclical aspect of instinctual motives is explained by the hypotheses that motives emerge, and are satisfied or frustrated, in cycles which are constituted as successive and varying patterns of interrelationships of elements in organization lead sequentially to one another.

Intensity and quality of motivation, it is assumed, vary with the progression of events in these cycles. It is these variations which occur with the progression of the cycle, which makes it seem that motives are autonomous or self-generating. As I have said, pleasure is associated with the correction of imbalance or with the transition from disequilibrium to equilibrium and unpleasure with the emergence of imbalance or the transition from equilibrium to disequilibrium.

Quality of effect is determined by the specifics of the reordering which occurs with the

transition from equilibrium to disequilibrium and vice versa, and intensity by the comprehensiveness of the interrelationships involved in the reordering.

Motives, then, are experienced as emerging and subsiding and reemerging as shifts in the locus and definition of disequilibrium occur with the progression of events in the cycle. Depending on the specificity and the comprehensiveness of the cycle, different motives or different forms of the same motive emerge as quality and intensity of affect vary.

Motivational hierarchy varies then as sequences of events are activated and terminated and reactivated in the context of their relationships to other sequences of events.

Finally, it is assumed that the primacy of sexual or erotogenic motives is due to their centrality. The centrality of these motives, it is assumed, is due, first of all, to the characteristics of the networks of elements which give rise to them. It is assumed that these networks are richly supplied with pathways linking its elements to the elements of other networks. It is

also assumed that, in the immature organism, the centrality of erotogenic motives, is due to the relative order of the schemata comprising them.

Conclusion

In this chapter I have presented, in terms compatible with Piaget's developmental theory and George Klein's model, selected motivational and developmental concepts. I realize that there are many aspects of motivation and development I have not touched on in this work. For instance, I have made no attempt to accound for drive differentiation, for anxiety and for conflict and defense. I have also made no attempt to account for the differences between the conscious and the unconscious and between primary and secondary processes. Neither have I made any attempt to account for intention and representation.

However, nothing in the model I have presented makes me think that it would be ultimately impossible to reformulate, in terms compatible with it, remaining psychoanalytic and developmental concepts. Such

reformulation might even, I think, clarify some of the ambiguities and inconsistencies associated with traditional psychoanalytic theory. The difficulty, for me, is one of time and the limits of any particular piece of work. With that I conclude.

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