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The Relevance of General Systems Theory to Psychiatry

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Introduction

The relationship of systems theory to psychiatry is appropriate for consideration at this time despite at least two decades of neglect and even resistance. Obstructions against bringing the two together are somewhat surprising in view of their historical origins and similar modern fate. The general laws of biological systems and their universal applicability were understood by the now-extinct naturalists in the early part of the twentieth century. Psychiatry beginning during the age of reason in the eighteenth century as a derivative of philosophy by way of psychology also began with holistic approaches. Unfortunately, biological sciences fragmented into smaller and smaller units or disciplines that became increasingly reductionistic, and psychiatry fragmented into schools representing its parts.

Paul Weiss expressed this succinctly: “In breaking down the Universe into smaller systems, into the society, the group, the organism, the cells, the cellular parts, and so forth, we dissect the system: that is we sever relations, and then we try awkwardly and clumsily to restore those relations systematically but frequently very inadequately.” Again Paul Weiss: “If we had come down from the universe gradually through the hierarchy of systems to the atoms, we would be much better off. Instead we now have to resynthesize

the conceptual bonds between those parts which we have cut in the first place."

Increasing attempts are now being made to develop unifying theories for all sciences, particularly the biological and others applicable to human behavior. It is as if systems analysis is searching for fitting empirical data and methods by which to test its basic concepts, and the extended and fragmented field of psychiatry is searching for appropriate general theory. The question of relevance of systems analysis for psychiatry is one example of modern dynamic or process thinkings which involves pluralistic or multifactorial approaches.

Systems Theory

Derivation

As supernatural and philosophical "holism" gave way to modern science, increasingly detailed and isolated bits of information were elicited from investigations of living and nonliving structures and functions. This corresponds to what Weiss termed "breaking down the universe into smaller systems." Physicochemical processes were expected eventually to explain life and all its attributes by so-called reductionists, as contrasted with the humanistic broad approaches by social scientists.

Academic psychology became patterned within the reductionistic framework as it imitated the hard sciences by utilizing the stimulus-response paradigm of reflex activity. Life processes were viewed as being in a natural state of rest or equilibrium disturbed only by powerful drives utilized in the service of survival or in response to extraneous stimuli. This equilibrium theory viewed life processes as primarily *reactive* and man was viewed as a robot.

Against this early twentieth-century tide a small coterie of naturalists working on experimental animals developed a series of process propositions on which many of our current concepts are based.' Briefly stated they are: hypothetical whole living organisms function not simply as sums of their parts but subserve new emergent functions; organisms mature by differentiation of primary undifferentiated structure-functions; living boundary structures are semipermeable and permit control of input and output; substructures of whole organisms exist in gradients under central control or regulation; final common pathways carry many processes from divergent internal sources to achieve near-identical actions; living organisms maintain homeostasis within a healthy range under conditions of moderate stress.

These and other paradigms derived from the biological, psychological, and social sciences produced isolated and sometimes disparate bits of

information. How do laboratory and behavioral researches dovetail and how do regulations at various levels of organization interdigitate? These questions within the general climate of philosophic appraisal of relevance led to the quest for theories concerned with the unity of science and especially of human behavior.

Definition of "Systems"

Systems have been defined with the use of many sets of words, but their basic meanings are almost identical. Clearly one must differentiate between living and nonliving systems, the latter being closed, with minimal or at least very slow exchange with their environments. The former are actively engaged in transactions with their environments as open systems. In fact, living systems can only exist by virtue of such exchanges.

The emergence and expansion of behavioral and social sciences, the abandonment of the reactive robot psychology applied to man, and the sterility of the reductionistic approaches to man stimulated multidisciplinary research oriented toward understanding total behavior and its component parts. Failure to reduce all behavior to a common basis and sterility of an encyclopedic accumulation of knowledge led to efforts at synthesis of total systems or, in other words, a unified theory of human behavior.

General systems may be defined succinctly as, for example, "a set of

objects together with relationship between the objects and between their attributes"; a complex of components in mutual interaction; a goal-setting principle variably operating by an "interplay of code-terminates"; "a regulated set of relations" with degrees of stability, change and meaning; or "a broad vision of a totally integrated field composed of many part functions and transactions, each of which constitutes the focus of a wide variety of scientific disciplines"; or, finally, "it is only recently that the term System has been emerging as a symbol for a key concept indicating a trend toward unified theory. To achieve such a step there are required at least three major advances: (1) to define organization, structural and functional wholeness and its relation to its parts and its environment; (2) to define basic principles applicable to the analysis of all systems of inquiry and (3) to define operations, in terms of procedures used, by which these definitions may be acquired."

Finally a more elegant definition has been furnished by Boulding.

> General systems theory is a name which has come into use to describe a level of theoretical model building which lies somewhere between the highly generalized constructions of pure mathematics and the specific theories of the specialized disciplines. The objectives of general systems theory can be set out with varying degrees of ambition and confidence. At a low level of ambition but with a high degree of confidence it aims to point out similarities in the theoretical constructions of different disciplines, where these exist, and to develop theoretical models having application to at least two different fields of study. At a higher level of ambition, but with perhaps a lower degree of confidence it hopes to

> develop something like a "spectrum" of theories—a system of systems which may perform the function of a 'gestalt' in the theoretical construction. Such 'gestalts' in special fields have been of great value in directing research towards the gaps which they reveal.

As a conceptual system in itself general systems theory can be treated by attempting to formulate its functional wholeness, its internal structure-function and the manner in which it leads to operational definitions. In a more practical way Ruesch' states that the observer characteristics, the coding characteristics, the form of information exchanges and empirical applications are necessary attributes of systems.

General system theory is what may be called a metatheory that is a conceptual overarching global theory which embraces several limited theories. These are the parts of the total system. These theoretical parts may be grouped according to Spiegel into *constitutional,* which includes the internal structure-function of the system, *integrative,* which functions to relate the parts to the whole and prevent their disintegration or fragmentation, and *determinants* that describe the function of the system in relation to other external systems.

It is not possible to enumerate the many subtheories or sub-subtheories since these are chosen according to taste, discipline, and available operations. But for the purposes of delineating parts of general systems theory that later will be considered relevant to psychiatry I shall briefly describe theories

related to (1) ontogeny, (2) differentiation and dedifferentiation, (3) regulation and homeostasis, (4) hierarchies, isomorphism and boundaries, (5) communications of information by transactions, and (6) growth, creativity, and evolution.

Ontogeny

Systems do not develop de novo because they and their parts have a past that remains part of their present even though partially obscured. A process of maturation and development characterizes both living and conceptual systems. For the latter, social-historical processes, changing value systems, and ethics contribute to conceptual shifts whether we speak of social changes or scientific ethics.

The developmental processes within living systems are more obvious although still not clearly understood. The science of genetics has been furthered by increased understanding of the genetic code incorporated in DNA and its transmission by RNA. Both aberrant and healthy genetic and experiential factors form the background of subsequent behavior at all levels of the organism from infancy to old age. Biogenetics and behavioral genetics are species and individual specific and constitute a system with only limited independence of environmental stimuli and conditions that are

necessary to release the inherent or innate.

An appreciation of the ontogenic system must include isolating not only the factors concerned with growth but also critical periods during which a jump step is made across a boundary, after which different forms of development are possible. Within this system, phases of the individual life cycle of health and illness from birth to death have their own structure, function, susceptibilities, coping mechanisms, and predominate types of degradation.

Differentiation and Dedifferentiation

Parts of systems come into focus by a process of *differentiation* from an undifferentiated whole. These parts may be enumerated in various ways, depending upon the position of the observer and the resolving power of the observer's instruments. Here we may limit our view to that of the human intrapersonal system beyond the physicochemical substrate of elementary particles, atoms and molecules, and the individual cells. Then we would include the confluence of cells into individual organs and organ systems, the communicating systems of hormones, enzymes and the nervous system, the psychological system that extends beyond structure-function, and the social and cultural systems learned or incorporated within psychological functions. Obviously many more and finer subdivisions or subsystems may be included.

Each differentiated part subserves special functions in relation to each

other and the whole by some form of regulation. In this sense they function in cooperation but are also in conflict or antagonism. These vectors of synthesis and fragmentation usually function adequately through opposing systems of enzymes and antagonists, nervous facilitation and inhibition, negative and positive feedback and by quantitative and temporal gradients. In the psychological sense drive impulses and external or incorporated social restrictions reach a level of accommodation.

Probably the processes of *dedifferentiation* begin very early. To quote an ancient saying: "The first tottering steps of the child are toward the grave." We are less concerned with this inevitable slow process of aging than with the various stress stimuli that evoke greater degrees of responses ending in physical disease or psychological disintegration.

From a single subsystem, which strain may cause to disintegrate functionally, to all subsystems and eventually to a total response, stress responses progressively spread and increase. The result is a multiplicity of circular and corrective processes between subsystems that are oriented toward stabilizing the organism and maintaining its integration. A breakdown between boundaries and an intensification of activity occur only when the strain becomes too severe. Likewise, the pattern of behavior partially resumes its primitive infantile functions when the several subsystems that have been fractionated out of the whole are no longer able to handle the

stress. At first, stress stimuli facilitate defenses, but when continued and increased, they disrupt and ultimately result in dedifferentiation. When the differentiated systems are under critical strain, the whole takes over and earlier patterns return.

Whether the organism reacts as a primitive whole before differentiation, or has been reduced by excessive stress to a dedifferentiated whole, the somatic and psychic systems are in a constant state of transaction with each other. Concomitant somatic and psychological action patterns probably occur only as the result either of lasting traumatic impressions made upon a total system before differentiation or of current stress forcing regression to that state.'

Regulation and homeostasis

As parts of a system become differentiated they do not separate as in primary fission. Instead they constitute parts of a system characterized by a totality of elements held together by some form of central *regulation* that maintains integration or in other words functions against disintegration. In embryonic phases such a regulator functions to integrate the differentiating parts in proper temporal sequence. Within the functioning organism local feedback circuits maintain homeostatic balance directed to a great extent by the pituitary or master gland. The central nervous system regulates

somatosensory activities in many ways but essentially in starting and stopping action, and relinquishing further control to lower levels. In psychological terms, ego functions maintain a balance among the pressures of needs, desires, and adaptive behavior.

Sometimes subsystems get out of control and the whole system decays. In other cases the regulator may be congenitally weak or crippled by drugs, disease, or fatigue. An example of the latter is the syndrome of ego depletion. The soldier's experiences after a war destroy or weaken the compromises he has made between drives and reality and between their opposing trends. As a result of a breakdown of such psychological regulation the soldier regresses to apparently more immature coping attempts that cannot be successful in adult life.

It is not implied that functions of subsystems, their regulation or whole system, are rigidly and exactly programmed. There is a wide range of successful *homeostatic* functions that are wider in the young, narrower in the old. Failure results from exceeding these ranges.

Hierarchies, Boundaries and Isomorphism

Hierarchies do not impose values on levels or subsystems in nonliving physicochemical processes, but they do in living foci such as cell, organ, psyche, society, and culture. All are essential for life that culminates in

cultural levels developed by human symbolic evolution. Hierarchies may be defined in an evolutionary sense in that each level is necessary for the development of the next succeeding, higher in the sense of greater degrees of complexity and more flexible, organization. Levels of organization are related to their evolution in time.

Since subsystems are functionally interrelated, we may agree with Wilson that the span of a system is "the number of subsystems into which it may be partitioned." It is also axiomatic that interactions *among* subsystems or systems are weaker than *within* subsystems or systems.

Living systems have *boundaries* that, in contrast with nonliving systems, are semipermeable, permitting substances and information to proceed in either direction. Von Bertalanffy uses the term *isomorphism* to denote identity of the basic laws of function characteristic of each level of organization or of each subsystem. There is probably some validity at an abstract level to this concept, but by virtue of organization there is a subordination of lower to higher levels and a specialization at each individual level. As Rapaport exemplifies, at the individual level there is a wide range of metabolic activity as contrasted with natural selection at the level of population. Each kind of behavior serves varying degrees of adaptation, not always adequate.

Hierarchies are dependent on higher levels maintaining a regulatory

dampening control over lower levels, but as higher levels weaken they release from inhibition the functional independence of lower levels. This corresponds to the Jacksonian concept of evolution and dissolution of functional levels of the nervous system. Also von Bertalanffy's equifinality, meaning that similar action may be expressed independent of the primary source or state of the exciting agent, is similar to Jackson's final common pathway.

Information and Communication

Theories of *communication* until recently have been reductionistic in depicting energy exchange as the basic process. There is no doubt that in living somatic systems this is largely correct. When, however, we proceed to the psychological system, although its fuel is dependent on energy furnished by the soma, its processes are conducted by means of communication of information. These may be described by a variety of vocabularies, such as those of mathematics, logic, linguistics, etc., but they incorporate values that have symbolic meaning for the more evolved species.

Information in open systems corresponds to negative entropy in that it organizes and consolidates the chaos of multiple stimuli into meaningful data. In other words, organisms do organize and counteract the degradation of life. No longer is the mechanical view of man passively incorporating mass for transformation into energy possible nor is vitalism tenable.

Man especially seeks goals, as an active personality system, for more than the gratification of his biological needs. He also searches for new goals. But what are the linkages among subsystems and systems except in informational processes? These have only become possible because man has created, uses, and modifies *symbolic systems* that are the bases for his more complex, flexibly adaptive, creative acts. An erudite somewhat philosophic discourse on language behavior is in Bateson.

Symbolic systems are not linear nor are linear explanations valid in cause-and-effect explanations. Instead we use the concept of *transactional* communication in which reverberating, corrective, circular systems of behavior at all levels are possible.

Evolution, Growth and Creativity

Systems have evolved. They are born, they develop and decay. Their position in this cycle of events is not always easy to determine. Dynamically, as organistic complexity evolved, systems became subsystems of larger systems, environments become part of expanding systems from cell to cosmos. In contrast, as systems decay they break up so that their subsystems became free and separately functioning systems.

The function of a system should be viewed in relation to other whole systems as, for example, the personality system in relation to society and

culture or one social system to another. Herein lies purpose or teleology: "Teleology is a lady without whom no biologist can live. Yet he is ashamed to show himself with her in public."

Abstractions, concepts, and theories are useful tools, not facts of "real nature." They organize experiences but do not describe their real essence. Experience with empirical phenomenon is the real test of knowing. Since techniques vary with each system, operations cannot be described by generalizations. From the use of objective models, general systems theory may be graphically demonstrated for public scrutiny. One such model and its applicability to psychiatry will be stated later.

Critique

Theories serve heuristic purposes and are never meant to endure should they be shown to be internally inconsistent and fruitless in generating testable hypothesis. A theory of systems should do more than furnish satisfaction for believers as if it were a religion. General systems theory has had its share of criticism especially because it has introduced a new language, applicable to its role as a metatheory, highly abstract and far removed from empirical data. One critic says, "So what? It only establishes analogies among levels of organization or a number of systems and contributes no real progress." Yet analogies are indeed significant sources from which to create

new approaches to problem areas; one only has to listen to multidisciplinary conferences to hear etiological "hunches." Symbolic thought is indeed analogical thinking for the most part and one of its creations has been the analogue computer.

General systems theory has no methodology as do no other theories, but it does establish a paradigm or outline a way of thinking of relationships, of parts and wholes, and of inputs and outputs. Furthermore, if adequately demonstrated by one of several models, it enables the observer or experimenter to identify his position among a vast number of variables. Although isomorphism has been accentuated as a characteristic of living systems, it in no way denies that individual processes, levels, hierarchies, or subsystems in addition to common properties also have specific functions and lawful regularities differing from each other.

General systems theory should not be confused with data or used as their substantiation, as we have experienced interminably in psychoanalytic publications in which the language of theory and data form a confusing mixture. Instead theory orients the observer toward a search for empirical relevancies on which the theory depends for its continued existence. These should include "resolution levels" or time as permanent, relatively permanent, or temporary. The laws of regularity may be absolute, relative, or local.

Nevertheless, a valid criticism against general systems theory is its premature mathematization indulged in by several theorists, turning away those who cannot understand such language or who consider it as yet too abstract or who erroneously misplace confidence in formulae instead of searching for empirical data.

There are two ways of dealing with complex, or multivariate, problems. One is to introduce arbitrary simplifications so that we can use the techniques of analysis that may be available. This is the mathematical approach. The other is to accept the complexity as an irreducible element in the situation and search for a structure or pattern that will enable us to examine it as a whole. This is the systematic approach.

A critique that involves a serious problem for a general systems or a unitary theory is the question of how subjective experiences are explained. This concerns its relation to psychoanalysis, studied especially by M. F. Basch in unpublished material entitled: “Psychoanalysis and the Resolution of the Mind-Body Paradox.” He states that analogies enhance and deepen comprehension but are not explanations. The essence of general systems theory is not mathematization, the language of relationships, but the reordering of relations by transformation of nondiscursive or presentational symbolism (primary process) expressed through art, music, rituals, dreams, and metaphors into verbal discursive symbols. The subjective or

presentational symbols are concerned with meaning and values that are qualitative rather than quantitative in their transformation into denotative language. In the psychoanalytic process much is lost although publicly accepted information is gained.

Applicability of General Systems Theory—Social Sciences

The word "general" implies applicability to all human living systems and their environments and products (anthropology, sociology, culture, religion, education, political science, legal systems, etc.). Such abstract systems as mathematics, logic, philosophy, etc. are included and finally, more practically, systems theory is applied to business, management, and corporate structures. Not all of the postulates of general systems theory are applied to each of these areas because some are not appropriate, but at least efforts are now directed toward systematic analysis of each. To consider all of these would require multi-authored encyclopedias. Since our major interest concerns relevance to psychiatry, to be discussed in a later section, only certain aspects of the *social sciences* closely related to psychiatry will be briefly considered here.

Although the systems of symbols will be discussed later it is essential to understand that man is a symbol-creating animal whose behavior is thereby less directed by signs. Representative symbols are continually being created and transmitted by tradition as the genes of culture. Toman points out that

even in chemical memory feedback may develop jump steps, one at a time, that become permanently differentiated experiences and accrete to the organism's structure rather than simply reproducing it. At a higher level, social systems have developed and are continually changing in accelerated fashion. But Toda points to the inefficiency of a fast moving, extremely energized society that needs a lessening in its positive feedbacks in order to develop more stability lest civilization breaks down.

Emerson elaborates:

> Symbolization is a sort of evolutionary trigger that profoundly differentiated humans and which lead to an integration in time with all the other humans. We are integrated in time with the cultural system. Now this integration in time also includes the organic, the physiological and the individual systems. Remember that the genes and the gene patterns in any organism, plant or animal, are a product of a long process of selective adjustment through millions of years. Any given individual organism at the moment is a product of its past. It is what it is because of past events that affected its ancestors and selected its ancestors and gave direction to the process of evolution. All living organisms are decidedly integrated with past evolutionary sequences. We are partly what we are because we had fish ancestors adjusted to a marine environment. But the mechanism of integration in time becomes vastly different with the advent of the symbolic systems in cultural evolution.
>
> My other point is that in spite of the change in the mechanisms of integration between an organism and a group, in spite of the changes that involve innate behavior contrasted to learned behavior, in spite of the changes involved in individual learning as contrasted to symbolic learning which integrates us with a society to which we belong, in spite of all these actual differences, the direction still has similarity. Every one of these systems is moving toward a higher degree of division of labor between

> parts of a whole; every one of them is evolving a greater system of integration of parts; every one of them is moving toward an increase in homeostasis.

The leading theoretical proponents in sociology are Talcott Parsons and his colleagues. Social systems do not identify individuals, but they deal with egos and alter egos characterized by action and reaction (transaction) while playing social roles within specific situations (environments). Culture is a complex, symbolically meaningful system arising out of social transactions and embodied in them. Parsons describes two classes of systems of action—personalities and social systems, related to each other by learning processes of internalization in personality and institutionalization in the social and cultural systems. Parsons states that social systems and personality systems are not only interdependent, but they also interpenetrate, creating boundary problems as one attempts to translate meaning from one to another. It is, therefore, extremely difficult to pinpoint cooperation and conformity to norms, conflict, competition, and deviation.

Parsons clearly states that there is a plurality of systems in the field of human behavior, and he believes that these may be arranged in hierarchies, in contrast to Spiegel who states: "The structural-functional interdependence of all parts of the field makes statements describing dominance or hierarchical relations of one part of the field over another essentially meaningless." But evolutionary development of organizational complexities requires regulation

of smaller systems or subsystems; hence the concept of levels and hierarchies is probably valid.

If we concede that the environment of a system becomes part of it only as we move up in the hierarchy, then by adding the biological to Parsons's four basic action systems we have, in addition, behaving organisms, personality, social, and cultural systems (the latter two separate). It is not coincidental that somatic muscular contractions appear first in biological embryogenesis, followed by sensory controls and modifiers. Thus, all systems are primarily action systems (i.e., behaving systems).

Emerson says: "I maintain that human society is moving definitely toward increased homeostasis and I equate homeostasis with progress." Thus homeostasis for Emerson is not only a unifying principle applicable to all forms of living organization but a broad principle as well, encompassing not only stability but growth, evolution, social organization, increasing complexity, and optimum variability. It has survival value if one applies homeostasis to "multiple systems and multiple compromises, both in time and contemporaneously, and between levels."

> The scientific principle of homeostasis assists in the resolution of many controversies and dilemmas. It relates the individual to the group, divergence to convergence, competition to cooperation, isolation to integration, independence to dependence, conflict to harmony, life to death, regression to progress, conservativism to creativity, organic evolution to social evolution, psychology to biology, emotion to

> intelligence, the conscious to the unconscious, science to ethics and esthetics, reality to value, and means to ends. It is both a mechanism and a trend of life processes. It indicates the gaps in our knowledge and understanding, and it directs future investigations.

Sociologists ignore the physical properties of the component parts of society, their origins and ontogenic properties. Action is not concerned with the internal structure of processes of the organism, but with the organism as a unit in a set of relationships. A good example is embodied in role theory where individual persons are omitted as units and replaced by roles that they play in various situations under various conditions at different times. The richness of personality depends on the number and variety of internalized social roles appropriate to multiple situations—and not rigidly organized for a supposedly expectable environment. Self-identity is attained when multiple identifications have permitted durable satisfactory object relations and society recognizes the subject as a person."

Wallerstein and Smelser, in discussing the articulation of sociology with psychoanalysis, speak of general principles applicable to any bridging process. They indicate the particular problems, determinants, hypotheses, and research methods of each discipline, and the need for realistic complementarity between the two. They specify the need to evaluate costs and benefits of articulations, the consequences of comparing multiple levels, and the value differences that essentially differentiate behaviors.

Laura Thompson enumerates the conditions necessary for an adequate theory of culture and then states:

> A human local community-in-environment is not primarily an inorganic, physicochemical system, nor is it primarily a system of human relations (i.e., a societal system). It is an organic organization of or structure-function web-of-life composed of diverse species or kinds of animals, microorganisms, plants and human groups, in the content of inorganic nature. Seen all-of-a-piece human community is an integral part of a larger organic whole or complex web-of-life, and its existence and welfare depend on the existence of the welfare of the larger whole in environmental context.

Definition of Psychiatry

Before considering the relevance of general systems theory to psychiatry, we should define psychiatry as clearly as possible in order to know its component parts and its extent, and to differentiate psychiatry as a medical-clinical specialty from psychiatry as a science. Especially is this true since the entire field is rapidly evolving, extending, and developing interfaces with increasing numbers of other specialties and systems. Unfortunately as Shepherd states: "During the past 14 years, I would maintain that the expanding role of the psychiatrist has far outstripped the gains in established knowledge."

But psychiatry is a specific science only as it is concerned with a particular system of verbal, gestural, and behavioral communications

characterizing observant-subject (patient) transactions. It is in addition a conglomerate of many sciences involved in the study of human behavior, including biological, psychological, and social sciences. Since man is a biopsychosocial creature, psychiatry must include these sciences as part of the total system characterized by whatever variables are in focus at the time. Likewise the applications of these parts and the total system have become so extended that psychiatrists have been likened to pioneer riders searching for fences that bound their territories.

Finally, the scientific approach to clinical psychiatry, according to Offer and Freedman, is approximately only three decades old and clinical research psychiatrists are indeed few in number. Nevertheless, it will be demonstrated that a general systems approach to clinical psychiatry is not only feasible but it is also productive, and that practice, reflection, investigation, and communication are the parts of a functional system characterizing a clinical investigator.

According to Mora many histories of psychiatry have been written from a variety of new points. In his paper the reader will find an excellent bibliography. There seems to be no question that psychiatry, by any name used during the ages and representing man's attitude toward his fellow men with emotional distress, expresses the social and cultural philosophies of the time. Despite the movement of professional psychiatry into medicine and

science, it still is heavily burdened by philosophies that shape psychiatry into their molds (existentialism, Freudian metapsychology).

Modern medicine seriously began to include psychiatry as a specialty in the nineteenth century in its concern with organic diseases of the brain. Specific cellular changes described by pathologists were presumed to be caused by diseases of the mind. Neighboring disciplines such as psychology with its brass-instrument techniques and later with its stimulus-response-robot concept of human mentality helped little. Beginning with the twentieth century, psychoanalysis offered etiological paradigms that turned out to be explanations of meaning never sufficiently proven.

It seems as if psychiatry, really psychiatrists, was divided into one group composed of therapists, including psychotherapists, Somato-therapists or socio-therapists, and another group involved in research conducted by scientific psychiatrists. This is not to assume that the latter works in the laboratory and the former in the clinic. Both are to some degree therapists and investigators. But as far as the public and the vast majority of physicians are concerned, psychiatry conforms to the medical definition of a specialty devoted to the diagnosis, treatment, and the prevention of mental illness. Psychiatric investigators used their essentially unipolar training and experience in special techniques, such as biochemistry, pathology, physiology, etc., with little reference to other techniques, developing thereby many small

subspecialities.

After World War II the focus of concern transcended the individual, a process continuing with rapid acceleration as a product of the times. Disciplines began to form multidisciplinary research groups, which were not really woven together but operated within a relatively broad or nonexistent unified framework with great difficulty. It was then, in the 1950s, that models were developed, and even though they only approximated reality and had but a brief life, they did create testable hypotheses.

Sometime in the latter part of the 1950s research and clinical psychiatrists became self-conscious when they suddenly discovered that psychiatry was an integral part of the vast field of behavioral sciences. Their focus could no longer scotomatize larger areas of behavior such as the biological, psychological, social, or economic. Ideas of unified, or systems, theory seem to furnish answers in their concepts of openness, communications, transactions, homeostasis, and isomorphism (see Ruesch, reference). Thus, on the one hand clinical psychiatry began to participate in social action under increased political freedom, and on the other hand research psychiatry absorbed field theories.

In separating the practice of clinical psychiatry from psychiatry as a science, we are dealing with a weak dichotomy. Clinical psychiatry can be

approached scientifically, and the sciences that form the system of scientific psychiatry are ultimately concerned with deviations in human behavior that require clinical contact and expertise in eliciting behavioral, cognitive, and affective data. The data of the basic sciences and those at the psychological level supplement each other. Unfortunately, life histories of patients reveal considerable diversity and general principles are difficult to abstract. In other words, it is difficult to separate what is individual and incidental from what is general and essential, thus making a system of classification extremely difficult (nomothetic and ideographic).

Menninger, Mayman, and Pruyser have developed a systems approach to psychiatric entities as a substitute for our inadequate nosological classification. Their four principles include (1) individual-environmental interaction producing adjustment or adaptation^ 2) organization by homeostatic mechanisms serving balance, (3) regulation and control according to the theory of ego or boundary functions, (4) motivation or instinct theory. They then describe a unitary theory of illness (instead of classification) related to coping reactions to stress. These are five orders of dysfunction or dyscontrol of aggression. They include: (1) mild nervous tension, (2) neuroses, (3) naked aggression, (4) psychoses, (5) rupture and complete decompensation.

The application of general systems or unitary theory to much of clinical

psychiatry is difficult. In an extraordinarily lucid paper, Spiegel sketches the theoretical propositions involving the transactional field and how those are applied to a study of families of various ethnic characteristics. Spiegel comments: "Evidently it is difficult almost by definition to keep the larger field of transactions in view when conducting clinical studies of diagnostic entities." This is correct. In our study of the Borderline Syndrome, although we devoted a chapter to "Society, Culture and the Borderline," we could only make general statements since we were unable to obtain significant data other than from the behavior of the subjects under study. Other clinical studies have suffered from the same deficiencies.

Once unitary theories were understood and accepted (sadly after about twenty-five years) psychiatry experienced expansionary trends. Today it is involved in health and in all the problems of human life from cell to cosmos as well as in all the progressive and destructive things that man has created in his environment. Man has begun to recognize that he is more than a mechanical reactive organism: he has evolved, grown, acts and creates, although he is still burdened by attributes unsuited to the modern world (unrealistic anxieties); and general biology has broadened its scientific vistas by including man as a psychological being.

The extension of psychiatry does not require the abandonment of any theory, or in our terms subtheory, but instead a redefinition to involve more

inclusive, larger theories of systems. For example, Schildkraut and Kety state that biochemical abnormalities are not necessarily genetic or constitutional, because early experiences may cause enduring biochemical changes. A multifactorial, theoretical framework is necessary.

Caws states:

> The most useful conception of the unity of science seems to me to lie somewhere in the middle of the triangle defined by the reductive, synthetic, and encyclopedic conceptions. Where reduction can be done usefully, it should be done; where isomorphisms can be found they should be found; and where disciplinary barriers to communication can be broken down, they should be broken down. What I have been chiefly criticizing here is an a priori approach to this problem, the assumption that there must be isomorphisms, the assumption that every science must fit into some rational order of the sciences. What I should wish to substitute for this is an empirical approach—not the claim that isomorphisms are necessary, but the recognition that they are possible, and the resolve to search for them wherever they occur. If a direct bridge is thus built between physics and biology, or between crystal growth and population movement, it is not because there *had to be* a bridge but because there *happens to be* one which somebody had the sense to exploit.

Where there is no bridge or at least bridging language, analogy is still possible and stimulating. For example, we may analogize social institutionalization with psychological internalization. Emerson analogizes the gene with the symbols of culture and Parsons the human incest taboo with sex differentiation at the organic level.

Interdigitation of "Systems" and "Psychiatry"

A theory's greatest value is that it leads to operations suitable for the testing of derived hypotheses. Such heuristic values may not be apparent at first. General systems theories enable the investigator to have confidence that there are some natural laws of isomorphism and insofunctionalism, and that research can discover both one's position as an observer with respect to evolution, birth, growth, stability, and death as well as their effects on the observed. The theory enables us to wander through forests of the unknown with some confidence that there are pathways to be found. An example of such confidence in 1959 the editor of the then new *Archives of General Psychiatry* wrote the following editorial for the first number:

> We publish contributions from all disciplines, whether morphological, physiological, biochemical, endocrinological, psychosomatic, psychological, psychiatric, child-psychiatric, psychoanalytical, sociological, or anthropological, that are related to the study of the behavior of man in health and illness. We attempt to implement the concept that man's behavior cannot in our day be viewed profitably from a narrow frame of reference. Instead, it requires a broad vision of a totally integrated field composed of many part functions and transactions, each of which constitutes the focus of a wide variety of scientific disciplines. Eventually, a unified science, or systems theory, of behavior may emerge.

This section includes personal, among other, examples of the uses of general systems theory for various psychiatric activities—one cannot say purely clinical or purely research, basic or applied, therapeutic or denotative. Although many writers have discussed the theory, few have applied it to research in psychiatry.

Psychotherapy and Psychoanalysis

Psychotherapy has many shapes, each constituting a "school." There is little reason to enumerate or define them all (psychoanalysis, dynamic psychotherapy, and other individual psychotherapies, group, family, community therapies, etc.). I shall now present one form in which I have consciously attempted to utilize parts of general systems theory: field, role, transaction, and information.

> In this *transactional approach* the setting or field of operations must be known not as a fixed state but as an ever changing matrix which affects the persons involved and is altered by them. The behavior of each participant can be viewed as portrayed through explicit instrumental social roles and by implicit roles expressing affective or emotionally meaningful messages. Through these rapidly changing roles within slowly moving fields, information is exchanged by means of verbal, nonverbal, and paralingual communications. Finally the cyclical reverberating influence of one on the other, back to the first, and back again, eventually reaches closure when information becomes repetitive and explicit role-complementarity has been achieved. At this point the implicit meaning of the transaction is communicated, and a new focus of communication is opened up.
>
> The transactional approach is operational; it requires an understanding of the tactics of skilled relationships. Its underlying basic theories involve field-role, and communication theories. It restricts the use of psychodynamic theory to the understanding of underlying motivations, conflicts, and defenses without the confusing use of modified psychoanalytic techniques.
>
> The transactional approach furthers the understanding of human beings in relationships with one or more other persons. Thus, it is a means for understanding social workers in relationship to colleagues, to staff, to members of other disciplines in the psychiatric teams, and primarily to

> patients, but this approach as we have used it is applicable to the understanding of persons in trouble by all therapists of any discipline. It is essentially the most adequate frame of reference from which to understand what people try to say in any relationship, especially when the role relationship is structured as that between the need-requesting client or patient and the helping social worker or therapist.

Wallerstein's highly perceptive critique of the transactional approach to psychotherapy correctly defines that one who has for so long been involved in psychoanalytic theory and its practical applications could not easily or completely reject its ingrained influences. Wallerstein transposes the language of the old to that of the new when applied to psychotherapeutic technics. Such transpositions have been frequently used to deny that anything new or different has been created. This is at least partially true as far as the core theory is involved but decidedly in error where the operational procedures are concerned. By adding field, transactional, and communication theories, the system even though maintaining some of the original Freudian core theories becomes a different system. This can be witnessed in the behaviors of many younger psychoanalysts who by thinking and applying systems theory have achieved a much more powerful tool in their therapeutic endeavors.

Others have also criticized psychoanalytic theory, important here only in relation to systems. For example, Farrell states that psychoanalysis is not a unified theory and as such is not refutable. Its parts, such as those related to

instincts or dynamics, development, psychic structures, economics, or defense and symptom formation, are not related to each other in transactions to indicate a general system. Charny and Carroll also state that efforts to bring psychoanalytic science into relationship with the larger scientific scene have not been promising. They state:

> Because the (general systems) theory calls for precise specification of the relationship of each level of organization to the next (vertical), as well as intralevel specification (horizontal), it provides a useful approach to behavioral and biological problems not easily dealt with in conventional physical theory. Specifically, it provides a rationale for the application of general systems theory to the study of psychoanalysis, for it allows for the ordering of complex data without implying direct causality; rather, this hypothesis carries with it the implication of simultaneous multiple causation inherent in the psychoanalytic notion of over-determination, or in Waelder's principle of multiple function.

Gill has attempted to equate psychoanalytic structural theory with a theory of systems involving modes of function (process) and modes of organization (structure). Indeed, there are indications that some more scientific psychoanalysts have utilized some aspects of general systems theory in their writings. Among the most erudite is Frenkel-Brunswik who wrote about psychoanalysis and the unity of science; Colby has done considerable research on psychoanalysis and information theory. Sullivan groped in this direction when he considered schizophrenia as a human process. Pumpian-Mindlin attempted to relate psychoanalysis to biological and social sciences, and Beres considered an ego system of structure function

in psychoanalysis. Finally, Anna Freud defined openness and multifactorial process in growth and development, in health and illness, and in therapeutic success and failure as hypotheses essential for the testing of psychoanalytic theory by a variety of methods.

Peterfreund attempts to relate psychoanalysis to information and systems theory. This provocative monograph is introduced by Bernard Rubinstein's prefatory statement: "Theoretical psychological models cannot be devoid of neurophysiological meaning." In the monograph, psychoanalysis is considered a segment of natural phenomenon, meaning part of a larger system. Nevertheless, psychoanalysts have tried to force the world of biology, physiology, and evolutionary time into a world the center of which is the mind of man. As we have read many times, beginning with Sherrington, "psychic energy" has no relation to physical energy. Instead it is a quality of information. Psychoanalysis still deals with conflict, and linear causes and effects, since it has permitted little cross-fertilization.

"It is possible to construct statements that, though necessarily either true or false, cannot be proved or disproved within the limits of the system itself. In order to demonstrate that such statements are necessarily true or false, we must construct a richer system that will provide the elements requisite for the proof." Attempts can be made, however, to interdigitate general systems theory with some aspects or parts of psychoanalytic theory,

though not all, especially since psychoanalysis is still a hodgepodge of unrelated concepts, old and new, good and bad, productive and handicapping. For example, topological theory identifies symbolic systems (unconscious, preconscious, and conscious) in terms of their positions in relation to conscious awareness. How these develop and transact may be summarized as follows:

> (1) The symbolic system has developed from a system of signs by an evolutionary jump-step, resulting in preconscious and conscious process as distinctly (?) human phenomena. (2) There are ontological phases of learning from body signs to visual imagery to primitive symbols to creative thinking, but the flow of information among these phases persists in all directions throughout life. (3) There are flexible transactional operations among these parts so that all are involved in all forms of thinking. (4) All the phases or parts of the symbolic system are in transactional relationship with reality and inner experiences. (5) A disintegration of optimum or effective relations among parts of the symbolic systems may lead to breaking off of transactions (repression), and thereby to distorted thinking and behavior or to temporary acceleration of creativity.

In a forthcoming monograph entitled "Systems of Psychic Functioning and their Psychoanalytic Conceptualization," John Gedo and Arnold Goldberg attempt to investigate the hierarchical interrelationships of "models of the mind" or systems of function. "By arranging the various psychoanalytical models and delineating the appropriate function of each to explain various systems or modes of psychic life, a supraordinate model may be constructed and used on a flexible basis as the situation demands." They emphasize a

sequence reflecting the succession of developmental phases through a chronologically organized scheme. Their overall plan is to describe the existing psychoanalytic models of the mind, to define their range of relevance, to delineate further models implicit in accepted theory, and to select and correlate the lines of development used for important nosological distinction into an overall hierarchical model under which all the described subsystems may be subsumed.

In discussing psychosocial aspects of disease Cleghorn states:

> As a paradigm for mental functioning, psychoanalysis was enormously stimulating. As a paradigm for mental disease, it is less apt. It has had a vast impact on social, anthropological and literary studies, which cannot concern us here. Perhaps its most pervasive, if unobtrusive, influence has been in the social attitude to illness. Here, of course, it shares with other social influences the responsibility for the re-emergence of humanism in the consideration of social ills and the psychosocial aspects of disease. The key concept is the meaning to the patient, which may include threat, loss, gain or insignificance.

According to most social scientists the family is a small system serving to protect and educate the young. It is not surprising that family studies in the best of hands should be oriented toward the understanding of the families' role in the production of deviance in one or more of the progeny, especially in their aberrant forms of communication;'' and the same holds true for therapy of disturbed youngsters whose problems lead one to family therapy. Minuchin applies general systems theory to the treatment of the family with

what he calls an "ecological framework." Group therapy has become widespread, and we look forward to its codification in terms of systems theory.

Health and Illness and Education

Only recently have psychiatrists paid attention to what is normal or healthy. According to Offer and Sabshin, there are several frames of reference from which to view normality: normality as an ideal fiction, normality as optimal integration, normality as adaptation within context. This is in contrast to Yahoda who writes about "positive mental health."

There are many other partial definitions of health. Buhler writes about four basic life tendencies on which personal fulfillment is dependent: need satisfaction, upholding of internal order, adaptation, and creativity. Zubin indicates that transcultural psychiatry may help to discriminate the culture-free from the culture-fair factors in health and illness.

In using systems approach Grinker stressed the relationship between soma and psyche in maturation and development and applied it to concepts of so-called psychosomatic diseases. Included was a blueprint for research on how early experiences become imprinted on both psyche and soma, reappearing as related defects in both, in the process of dedifferentiation. In later research on a group of healthy young males termed "homoclites,"

Grinker developed a number of variables within the total transactional field that contribute to mental health. These include among many others: physical health, average intelligence, adequate affection and communication in the family, fair discipline, early-work experiences, sound ideals and goal-seeking rather than goal-changing. The end result contributed to adaptation within a specified environment. Bowlby also utilized a systems approach as he discussed the ontogeny of human attachment, dependency, and detachment from maternal figures.

The health-illness systems cannot be separated to define health and illness, each in absolute terms. Health is dependent on factors such as age, culture, and social attitudes, internal compensations, defenses, coping, etc. In general, health is maintained when strains affecting one part of the biopsychological system is compensated for or counteracted in some way by other parts. Even a new relationship or dysequilibrium of the parts caused by stress may eventuate in an adequate adaptation.

In general, the health-illness system involving body and mind extends from the genetic to the sociocultural and encompasses development and decline. This includes birth, infancy, childhood, adolescence, young adulthood, maturity, aging, dying, and death. Each phase has its characteristic internal processes, its specific stresses and capacities for defense, coping and reconstitution. Each and the whole have their interfaces with specific

sociocultural environments, their ecosystems. This concept transcends disciplinary lines; it combines knowledge of laboratory procedures, life in pairs, families, groups, and the larger society. It is concerned with phases of stability, stress-responses, and despair.

Stages in the life cycle considered as a system may be viewed in several ways. For example, in one manner we may view the subsystems of ontogeny, including genetics (bioamines), family (communications), experience (trauma), as parts of ontogeny all leading to health or illness as well as degrees of susceptibility to the latter and coping devices for the former.

In another manner the stages can be enumerated as follows: (1) the relatively undifferentiated neonate; (2) the phases of differentiation or learning through imprinting, reinforcement, imitation, identification, etc.; (3) the phase of specific personality, psychosomatic, and coping development; (4) the phase of health, including proneness to disease; (5) the phase of disease; (6) the phase of chronic illness; and (7) the phase of dying and death.

Each phase has its genic, environmental, and experiential components, and to a point not yet understood, spontaneous movement and shifts due to intervention may occur. Corresponding to general systems theory, the principle of isomorphism of each level may be assumed. It is important for research and for the practical goals of therapy to incorporate phases of the

individual life cycle into our educational processes in universities and medical schools.

From another point of view Greenblatt has recently considered education and action in management as a multiplicity of systems. For psychiatric administration there has been little concern, although it is increasing in importance because of the multiple functions all psychiatrists must serve. He states:

> When the resident becomes a Ward Chief or Senior Resident he is in a more complex world—the world of patient groups; of environmental systems, both physical and social; and of administrative systems of the hospital, which he begins to appreciate for the first time. He is also in the interface system between the hospital and community; the system of professional organizations to which he and other professionals belong; and the university system, if he is in training in an academic environment and especially if he has professional ambitions.

Everything that Greenblatt states about residents applies to all psychiatrists to greater or lesser degree, and systems approaches seem the only solution to what is an "impossible profession."

Community Psychiatry

Currently psychiatry more than any health-illness system has become involved in the community, not only because of the need to furnish services to the indigent and working poor but also because of the vast amount of federal

money available and the pressures from these funding agencies. More important than these reasons is the fact that after World War II the importance of the individual declined, and the focus turned on the convergence of man in groups within a social environment as part of a larger social movement. This necessitated attempts to link the disciplines of psychiatry with those of psychology, sociology, and anthropology (see Ruesch). In fact, vigorous attempts are being made to substitute a social model of psychiatry for the medical model that will depict psychiatric disturbances as social disabilities leading to more or less permanent exclusion of the individual from his group.

Extravagant claims have been made for community psychiatry without sound processes of evaluation, except in rare instances. Kellam and Branch indicate that currently community psychiatry is a non-system in an experimental area where mental health is poorly defined except as internal well-being and appropriate adaptation. They state:

> In our view intervention should be intimately related to the processes which occur in social contexts in the community. Thus the targets of intervention are not restricted to individuals or families as in the case of the clinic setting. On the contrary, any aspect of the social field-processes related to the individual's sense of well-being can be subject to intervention. In school the classroom is a major social field and the teacher, the peer group, the family, the administration of the school, or even the curriculum can receive the attention of the intervention process.
>
> Such a social system view of intervention requires, however, more than

> mental health skills. Other health, education, and welfare workers, who are under increasing duress because of the general failure to meet human needs, may also ascribe to such a view. Indeed our own experience, based on systematic studies and clinical impressions, raises the question as to whether our focus ought to be on mental health as a speciality or on an integrated human service system that seeks to approach mental health through institutional processes which are more consciously and purposefully concerned with the breadth of human need.

If we subtract the utopian concept of "primary prevention" from the *Community Mental Health Movement,* then it becomes simply a complicated organizational process by which the delivery of mental-health services is improved. Two basic changes can be effected:

the medically indigent will receive appropriate services within their own communities, and (2) all the resources within and near the community will be available without delay or bureaucratic obstacles. Thus community mental health becomes a system of services containing parts, having appropriate linkages, under unitary supraordinate organization with interfaces, to other social welfare systems. It needs no modification of systems theory, but it requires money, manpower, and political structure, and competent management. Its effectiveness is as yet not proven, but requires extensive well-planned evaluations. Hansell states: "The formulation of a mental health service network as a system is an acknowledgement of the related facts that the human personality is a system, that society can be understood as a system, and that the casualty management network is a

subsystem of that society."

Social Psychiatry on the other hand is a rudimentary scientific hybrid, not clearly defined since it represents the combination of two fields. One deals with aberrant, internal psychological processes and deviant behavior classified as diseases, the other deals with aggregates of people characterized by specific functional structures, values, and moral philosophies. The combination of any two disciplines such as implied in social psychiatry, biochemistry, psychophysiology, etc. is fraught with difficulties and resultant errors. As pointed out by Wallerstein and Smelser, unless there is a complementary articulation between disciplines a low rate of predictability ensues.

It seems evident that social life structures opportunities for individual, instinctual gratification, but it also frustrates them by demanding many renunciations. The concept of balance between these polarities characterizes unitary thinking, although the empirical phenomena indicate that one or the other polarity has dominated at various times in the history of each society. Society provides ego ideals, ideologies, and social roles for personality development, but the social structure is developed and is maintained by a variety of personality conglomerates.

It then may be assumed that, out of this matrix, factors promoting types

of health and/or illness have great significance no matter how strong biogenetic defects may be. Psychiatric problems arise out of a social matrix and in turn alter that matrix with the same reciprocity that articulates personality with society. The relevance of social psychiatry in the development and persistence of deviant feeling, thinking, and behavior is what concerns us. If we know the what and how of this influence, it may be possible consciously to prevent or even change those social and cultural factors that most significantly facilitate psychiatric problems and thus become a part of a system of health services and of primary prevention. From a practical standpoint, the operations of so-called community psychiatry should be based on the characteristics of multiple subsystems within a community-mental-health center and on the transactions among various systems within special communities such as social agencies, police, courts, schools, churches, etc.

Affects, Stress and Coping

Experiences related in *Men Under Stress* as well as the results of other researches indicated that emotional specificity in the production of psychosomatic disturbances is rare. Indeed, after much time, energy, and work we began to understand that a variety of stress stimuli could produce specific responses in individuals. The theory of response specificity was thus developed and, perforce, had to include the wide number of subsystems that

preceded and contributed to classes of responses, including experience, coping mechanisms, and personality characteristics.

We developed systems of quantification of affects: at first, anxiety and, then, depression and anger, as well as defenses against emotional responses. To translate this conceptual position, it became necessary to develop a multidisciplinary team and to utilize general systems theory. The latter as related to anxiety on which we concentrated first is as follows:

> As the determinant of a system, anxiety maintains components or processes of organization involving total behavior in the social environment, cognitive and connotative functioning, and physiological actions, all of which are adaptive under conditions in which anxiety exists, for as long as it remains. The total system is involved with the environment in that external influences or internal disturbances acting on the anxiety system may augment its component activities or stimulate behavior of the organism to remove itself safely from the dangerous stimulus to which it is highly sensitive, or to attach in attempting to destroy the danger. Thus, even if interest is centered on anxiety as an organization, with its multiplicity of component parts, transactions that involve environmental parameters are ever present. The total social and interpersonal setting in which the observed subject lives and moves should, therefore, be taken into account, either by recording its changes or controlling its constancy as much as possible. We could define the component parts or sub-systems of anxiety according to our own choice of variables hoping from the biological point of view to measure activities as close as possible to the central nervous system and the hormonal systems. These choices were dependent on the available methods and the available experienced personnel. Within the system we hoped to stimulate in turn various sub-systems but in reality concentrated on stirring up anxiety, anger, depression and defenses in different experiments.

Schizophrenia Research

Investigations of this most mysterious scourge of mankind have produced thousands of papers from biogenetics to sociology. Each scientific group offers something different in the form of etiological theory, but we cannot even be sure that the sample of patients each studies is identical or even similar. This points up that although we freely use the term schizophrenia, we do not know the *what* of the disease.

For example, Macfie Campbell, commenting on the increased frequency of this diagnosis as long ago as 1935, stated that dementia praecox (schizophrenia) is not a disease but a Greek letter society: "The conditions for admission are obscure, inclusion and exclusion vary from year to year and place to place, and the Board of Directors is not known."

A research program on schizophrenia is therefore an excellent focus on which to exemplify the application of general systems theory and an area from which to derive a theoretical model.'

Schizophrenia is probably a polyvalent outcome of several variables comprising a system or organization that represents a form of functional adaptation. The form is only fixed as an end product, since individuals show a high degree of variability and since the forms differ as indicated in the high degree of variability between individuals.

There is not sufficient evidence to determine whether the primary defect is within *a part of* a developing or functioning psychobiological system or in the *organizational processes* ordinarily successfully integrating the parts. These roughly may be biological (biogenetic, etc.) psychological (childhood experiences, etc.) or environmental (stress stimuli, etc.). What can be assumed is the requirement that experimental challenges evoke the vulnerabilities within the parts of the whole system and that spontaneous or life challenges are necessary to move a schizotaxic individual to overt schizophrenia and possibly eventually into a psychosis.

We recognize that even though we may on theoretical grounds consider the propositions that the schizophrenic is primarily characterized by a disorder of proprioceptive and autonomic feedback, or that the schizophrenic is adapting to a primary unique quality of anxiety, or to a defect in attention and memory, or to a deficient capacity in internal information searching, or to a deficiency in central nervous system and/or endocrine functions, some adequate linkings or bridgings are necessary in a general systems approach.

A scheme or model for the representation of variables to be considered in a study of schizophrenia is appropriate. To be emphasized is the transactional nature of such a model. Attribution of cause and the role of conflict are omitted. The model would assume the form of a cylinder with the height representing levels or hierarchical placement of items. The cylinder

would indicate the relationship of the parts within three component columns. The first would represent somatic variables such a physiological, biochemical, enzymatic, cardiovascular, central nervous system, drives, and regulatory and control systems pertaining to these variables. In the psychological column, there would be such psychological systems as memory, perception-motor behavior, cognition in general, superego functions, and the regulatory and controlling systems relevant to these variables. Under the column of environmental aspects, there would be the various kinds of stimuli that impinge upon the organism, the various stresses and strains and human objects available for relationships. This scheme does not state anything *specific* about the relationship between and within the columns, but it does assume that there is some kind of a functional relationship between and among all three of these columns. Thus, variations would occur and, therefore, one could not ascribe a specific cause to any one of the three columns. Behavioral scientists have attempted to conceptualize the variations by naming them "psychosomatic," "psychosocial," "psychodynamic," "medical-social," and so on. These terms seem to beg the question concerning the nature of the "interact," and that such interaction gives rise to behavior. It may be more accurate to look upon the contingent variations as giving rise to *experience,* which becomes associated with behavior that has particular meanings.

The manifestation of each of these variables must be observed in

transaction. It may be quite beyond our grasp to observe more than two of these three variables in a transactional field at any one time, plus the observer. Therefore, one should always include the psychological variables and observe the variations of the two others. We would thus be observing one ego function in one particular steady state or at one particular point or time, and we would observe the effects of that variable on another dependent variable at the same time. It would be a methodological error to attempt comparisons across temporal zones. Thus, it would be a mistake to relate a particular kind of heart-rate pattern of today with poor mothering twenty years ago.

The model of the cylinder permits one to move in two directions: from trait to trait in the psychological field, or across time within the psychological field, thus giving a longitudinal cast to a study. In such an instance, we would be observing the changing nature of specific functions over time. The depth of the cylinder gives the model the dimension of differentiation; the center would be the point of maximal differentiation. Thus, plotting the schizophrenic's behavior over a lifetime, it would be understandable that in later years the schizophrenic patient would show a greater independence from drive functions or even from his environment, which would give the appearance of the "burned-out schizophrenic."

The cylinder is thus in the form of a periodic table, indicating to us those

variables which would be important to study. We recognize that these subsystems are only concepts, empirically not at all dependent, and we can view them as conceptually isolated. Such conceptual isolation, however, does not relieve one from the task of recognizing the effects of other variables on a particular one under scrutiny. It is therefore important that we attempt to keep constant or under control the variations occurring in other subsystems. The scheme makes no provision for causation, for explanation, for purpose.

To recapitulate, we should ask ourselves several general questions, a few of which are outlined. What is the nature of the deficit or of the regressive dedifferentiation? What parts of the total biopsychosocial system are most involved or most vulnerable? Is the deficiency in some general organizational process? What are the appropriate stress stimuli and their meaning for survival? What and when are the earliest indicators of differences? How do we separate the essential primary process from its secondary elaborations or adaptations? Is anxiety as a quality an inherent or experimental difference? Can response specificity to ordinary challenges, artificially induced stress-stimuli or historical data be determined? Does the schizophrenic reveal a different level of arousal potentiality? These and many other questions become important in clinical research programs oriented toward studying "process" rather than "content," and they are the basis of selection from the wide variety of individual projects focusing on parts of the total system.

Concluding Remarks

The essential components of general systems theory have been outlined as a metatheory. Many years of resistance were influenced by the fact that psychiatry for a long time was only a medical speciality and dominated by psychoanalysis, which had its own umbrella called metapsychology. When scientific or research psychiatry became part of the behavioral sciences, a general theory was needed to counteract the parochialism of its contributory sciences. On the other side of the coin, the Society for General Systems Theory and its journal *General Systems* was a mixed bag. Few authors were actually doing research—they philosophized and many of them prematurely resolved dilemmas by mathematical equations, in a language poorly understood by the empirical investigator.

Gradually, more and more psychiatrists became interested and organized their own special groups, hoping to communicate in a common language consonant and not disjunctive with their own biological, psychological, and social models. They were tired of senseless controversy about who knows *the* cause; they became convinced of multi-causality and reciprocal relations rather than linearity of cause and effect. As a result, the probabilities of a systems approach were enhanced. This is not to assume that any scientist could cover the entire field, but he could feel more comfortable knowing where he was, instead of endlessly riding around in search of

boundaries.

Psychiatrists began to recognize that systems and subsystems constituting hierarchies, bounded by permeable borders encasing reverberating transactions, had structure functions and integrative processes. But more than that, they realized that a system functions in relation to other systems. In fact, the proof or validation of a system's functions cannot come from within, but depends on its "purpose" in relation to another system. This respectable teleology gives meaning to human research that, admitted or not, is the goal of science rather than its being simply a game that we enjoy playing.

Following the outline, systems approach to the social sciences accentuated human symbolic functions that are the essence of humanity—individual, group, or society. It is deviation in development, disturbance in integration, and failure to react conservatively to human or inanimate environmental-disturbing stimuli that constitute the essence of disease.

Next, the relevance to psychiatry was considered by exemplifying a few problems with which the author has been involved, for which systems theory could operationally assist in answering. These included psychotherapy and psychoanalysis; health, illness, and education; community and social psychiatry; affect, stress, and coping; and schizophrenia. In not one example

can the entire systems theory be applied, but some parts of it are readily available and profitable. In the future psychiatrists can anticipate more and more use of operational research based on general systems theory, which will enhance our knowledge of causes and courses of and therapies for psychological disturbances.

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