

an evolutionary context for schizophrenia*

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Everything we now are—including our anatomy, functioning, and emotional life—arises from past forms, functions, and feelings and, as such, is shaped at least as much by the distant past as by the near past and the present. It is therefore difficult to understand why psychiatry has paid so little attention to evolutionary processes; but perhaps, this neglect can be traced to the fact that man has so long considered himself to be unique that the comparatively recent idea of his unity with and descent from the rest of the animal world has taken something over 100 years since Darwin's time to percolate into the general consciousness.

The variability in phenotype afforded by genetic inheritance provides each generation of a species with a sufficient range of individuals that some, proving more adaptive to the contemporary environment than others, prosper and over time come to suffuse and dominate the gene pool of their population. Thus the appearance of a variation that proves valuable for survival in even a single creature in a population will be found at a geometrically progressive rate in succeeding generations until a large proportion if not all members of the breeding group manifest it. The earlier form or function, however, is not entirely eliminated. It is retained recessively in the genetic potential of the group and occasionally emerges. It remains available, so to speak, should circumstances favor it once again. The form and function of any creature at any given point in time, therefore, is in effect a selection made by environmental pressures out of a repertoire of forms and functions genetically available to it. Hindsight, viewing the sequence of actual realizations, generates a notion of purpose or direction.

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In all species, then, natural selection, as well as sexual selection in contests for mates, tends to eliminate maladaptive characteristics from the extant population, but nevertheless occasional individual creatures exhibit maladaptive traits. Human beings, however, while subject overall to the same principles, to a certain extent counteract their efficacy by preserving the maladapted and permitting (even encouraging) them to breed. It follows that in terms of our present subject, neurophysiological mechanisms, the human species carries the potential for a large range of maladaptive responses. To be precise, all species carry genetically a potential for contemporarily maladaptive responses, but since human beings preserve their maladaptive individuals to adulthood, in our species such potentialities are more apt to become manifest.

As we have pointed out elsewhere, human anatomy has evolved by a very generalized slowing down of processes resulting in our neotenuous form (Jonas and Jonas 1970 and 1971). That is, a form that retains in its adult phase traits that were juvenile, even fetal, in our evolutionary forerunners. Of necessity, youthful physiology and behavior have paralleled this slowing down of development. Clearly, a stretching out of developmental processes must be promoted by hormonal and enzyme factors, governed ultimately by rate genes (Huxley 1942), and each delayed phase in turn affects the onset and development of others. Slowing down, delay, and inhibition are hallmarks of our species. We experience the longest period of growth; sexual maturity is deferred by a latency period, although in the female the ovaries reach full growth by the age of 5; and adolescence itself is protracted beyond any equivalent even in higher mammals. As a result our adult form exhibits the fine skin, absence of pelt, small teeth, thin bones and nails and very many other features that are characteristic of the young forms of our forerunners. More importantly, this underlying generalized factor becomes an element in

the capacity for the delay of neural messages at the synaptic junctions—which is a fundament of our ability for logical thought, judgment and reason, and also for the ability to totally inhibit responses.

The adaptive advantage to our species of developmental slowing has been the time gained for brain development through learning and a plasticity of function and behavior facilitated by a lack of anatomical specializations. A byproduct has been the readier accessibility of a great variety of archaic responses some of which, when triggered by the circumstances of an individual's experience, prove maladaptive in our present largely culturally determined environment (Jonas and Jones 1974).

This culturally determined environment, of course, has its origins in that period when mankind made a transition from hunting and gathering to primarily agricultural groups. During that period our species had to develop neurophysiological responses that would permit creatures adapted to life in small bands hunting over a territory, or range, to congregate in denser and settled populations. During that period also, their improved weaponry probably became a factor in decreasing predation upon them while, as agricultural habits took hold, increased food production supported—and in fact required—larger and closer living groups.

The earlier hunter-gatherer economy was in no essential way different from the way of life led by many mammalian species still extant. Several observers have noted, for instance, many similarities between the social habits of the wolves and those of hunting tribal groups of man (Woolpy 1968). In all such hunting packs or bands we note a propensity for controlling numbers and for the spacing out of these groups over their traditional territories; such a propensity must be governed by innate processes as well as by culturally conditioned learning. It is those innate processes that promote a need for a certain spacing out of individuals, or of small groups of individuals over a territory, that had to undergo adaptive changes some time between 60,000 and 100,000 years ago—not very long in evolutionary time.

We see a process in which successful hunting and then agricultural habits promoted increased populations living in smaller areas, and therefore subjected to a great increase in the social stimuli to which the organization of their nervous systems were exposed. In this environment those individuals who were better adapted to closer group living obviously had a selective advantage, and over time their descendants have come to dominate

human gene pools. They were the forerunners and prototypes of the modern gregarious, socially adapted and popular people who are to be found at the center of any working, professional, or social group today.

As the ability to tolerate proximity took hold and proved adaptively successful, it provided a momentum of its own that culminated in the rise of the earliest civilizations some 5,000 or so years ago, and the founding of cities—a new environment in which grew and flourished the seed of modern urbanized life. Admittedly this took place only in a small proportion of the world's societies; but the success of these societies continues to spread, engulfing those tribal groups that still exist and also eroding their own rural groups. It is, however, over a very short time in evolutionary terms that modern social groups have become man's environment, and therefore it is hardly possible for adaptation to crowding to have become firmly or completely fixed.

The need for the ability to tolerate crowding for social adaptation becomes more important at an exponential pace. To this end mankind has turned its intelligence and its energies to aiding nature's adaptive processes by doing to ourselves what we have learned to do with our domesticated creatures. We have, for example, learned how to take sheep, goats, and cattle from their natural surroundings and to select and breed them for our own purposes. Now, man in his turn has become, and has actively assisted himself in becoming, a domesticated animal. We train our young in control of bodily functions and in social habits conducive to close-living group life. To a certain extent we even train breeds within our groups specifically adapted for certain functions—strong bodies for labor or warfare, mental training for cultural endeavors, personality qualities for leadership, and so on—much as we train certain breeds of cattle or dogs for specific purposes.

It is our contention, however, that just as we find occasional individuals in any highly bred species of plant or animal displaying earlier characteristic forms, so in man we find some among us who manifest behavioral responses that were appropriate in the distant past of our species' existence but are no longer so in our own time. We believe that the schizophrenic comes into this category, and we intend to show how his special characteristics are more in keeping with an earlier phase of man's species history—that he is in fact one of those in whom a genetic bias for earlier functions actually emerges while in most of us it is carried recessively. This would make him the equivalent of a separate breed, in a

way like those separate breeds of other domesticated animals each especially suited to certain tasks or environments. Such separate breeds are all part of the species from which they derive since interbreeding is possible between them, but they are better suited to separate existence.

The evolution of the sociocultural development of human groups provides us with suggestive clues that much of the indigenous behavior of the schizophrenic has many elements in common with adaptations to earlier modes of life. Of course, we have to separate the schizophrenic's *basic* response pattern from the behavior he displays as a result of being the equivalent of an alien creature in an environment to which he is not adapted. The discrepancy is even more pronounced when we observe a chronic schizophrenic in an institutional setting. There, his plainly aberrant behavior is as different from his basic pattern as is that of a caged animal from its feral counterpart. To illustrate, Zuckerman (1932) gave a highly accurate and detailed description of the mating behavior of nonhuman primates. All interested people accepted this as a definitive piece of work. But later observations undertaken in the field indicated that much of Zuckerman's description was of behavior that was aberrant and nonexistent in the natural habitat. There is a strong possibility that conclusions about the schizophrenic in an institutional environment have a parallel with those about primates that were observed in alien and stressful surroundings.

It took a quantum leap in attitudes to realize that even with the best and most humane understanding of the needs of animals, we cannot entirely remove the stresses that any creature experiences in an alien environment, and there are strict parallels between this example and the current belief that humane care and loving understanding can provide an ambience in which the schizophrenic, who is not adapted to it, will feel no stress.

Basic schizophrenic responses do not exist unalloyed. As in all human conditions there are gradations all the way from the normal to the most extreme. Using neurophysiological adaptive mechanisms as a yardstick, we can arbitrarily label these gradations in the following subtypes: the normal, the sensitive, the hypersensitive, the preschizophrenic, and the schizophrenic.

Many—probably most—of the threads that make up the tapestry we agree to call schizophrenia exist in us all. In most of us, however, they are overlaid by later developed ones, especially those governed by our neo-

cortical brain. In modern man we find, on the one hand, an increased ritualization of the informative aspects of social interactions and, on the other, an emancipation of neurophysiological response patterns from holdovers of earlier stereotyped action. Together these become elements in present day appetitive and consummatory pursuits that fit into the mosaics of modern social life. But in some of us conditions of rearing, illness, or other individual circumstances have conspired to render less conspicuous the threads that compose the newer patterns and to bring into prominence those that are part of the older ones. In the preschizophrenic the older patterns dominate the design.

Because every observer of schizophrenic behavior sooner or later sees in it elements that he recognizes in himself—albeit intensified, distorted, or reduced—the familiarity of that behavior elicits a variety of responses: fascination, avoidance, revulsion, or denial. The clinical observer, subject to his own brand of countertransference, then mentally finds confirmation for whatever theory he happens to support. And this certitude is often abetted by the patients, who discover soon enough that their production of material pleasing to the therapist readily gains his acceptance, and who then relate such material—not so much to please him as to allay their own anxiety that he might become hostile. In the same vein but on the other side of the coin, the schizophrenic is often administered a surfeit of drugs less to reduce his discomfort than to quiet the apprehension he arouses in the hospital staff. Indeed, the schizophrenic upon entering an institution is treated much like a strange and possibly dangerous animal newly arrived in a zoo. This treatment is in line with our suggestion that the schizophrenic is regarded as an individual of another species, which, if we consider the nature of his adaptive responses, to a certain extent he is.

Having acknowledged that schizophrenia, like love, is a human condition that is recognizable but that defies unequivocal definition, let us now examine some of its manifestations, keeping in mind the evolutionary framework we have chosen as our context.

Manifestations of Schizophrenia

Paranoid Ideation

Paranoid ideation is readily comprehensible when we remember that almost all animals in their natural

surroundings remain constantly on the alert for possible danger at all hours of the day and all the days of their lives, so that it is not surprising that we human beings retain a sense of being on guard against menace from the environment, even if this menace be figurative. The normal is able to accept social conventions that foster trust in fellow human beings, and thus these social conventions help him to suppress the fight-or-flight reflex that is still part of the adaptive repertoire of us all. But this ability has a range, and at the other extreme the schizophrenic retains the original reflex relatively undiminished by those socially promoted inhibitions that are a product of the later phase of man's development.

Schizophrenic Cognition and Language

The complexities of schizophrenic cognition and language make it exceedingly difficult to offer an encompassing explanation for them. Many are due to distortions arising from stress, but when we unravel from these the ideational patterns that are basic to schizophrenia, we catch glimpses of earlier evolutionary adaptation. To elucidate this we must digress a little here.

As mentioned in the introduction, the generalized slowing down, delay, and inhibition that mark human development also reach into the delicate balance of anabolic and catabolic activity at the synaptic junctions. Inhibitory mechanisms permit us to delay a response and to select from alternative solutions. They act as an effective filter enabling us to concentrate on one thought sequence while holding others in abeyance or extinguishing them. Thus the cognitive system can operate optimally and without overload. A visible manifestation of the principle may be discerned when people are subjected to crowding in, say, a train or bus during rush hours. The ability to dim the impact of the stimuli and to inhibit responses then enables them to shut off overt reaction to the proximity of others that assaults the senses and would otherwise be intolerable.

We shall be returning to the evolutionary significance of the ability to tolerate crowding, but here we simply note that this ability, as well as that for filtering the stimuli that produce thought processes, is a late acquisition and that the latest evolutionary acquisitions are the first to be affected under any adverse circumstance. In such a case phylogenetically earlier mechanisms take over. These are not without communicative value. On

the contrary, they form a rich base for the artistic use of language, and they make possible descriptions of the underworld of the emotions in far more expressive terms than logical thought processes. But they are useless in a technological context. One cannot use metaphor or any kind of poetic thinking in designing a machine.

Heightened or Diminished Sensory Perceptions

Stemming directly from the reduction or loss of the stimulus-filtering mechanisms is another characteristic that is typical of the schizophrenic—heightened or diminished sensory perceptions. The inability to use language logically and effectively leaves the schizophrenic with no alternative but to communicate non-verbally, as do all creatures other than man; indeed, outside the realm of logical thinking very much can be, and is, conveyed to us by such means. It is worth remembering that creatures at the nonverbal level have an exponentially heightened sensory perception. This attribute is almost invariably noted in the schizophrenic, especially in the almost uncanny awareness he seems to possess of the unspoken feelings of the therapist. Arieti (1974) has stated that the schizophrenic behaves as though he has a psychological radar that enables him to detect and register the world's hostility much more than the average person. It is entirely possible that the other side of this coin, the diminished sensory perception also frequently noted, may not represent basic apathy but, rather, a defense against the overload of abnormally heightened perceptions.

Lovaas, Litrownik, and Mann (1971), like several other scientists, have described a learning deficit in autistic children that they characterize as a failure to transfer information across modes. They found that such children, when simultaneously presented visual, auditory and tactile cues, could respond to only one at a time. It was as if, when the autistic child listened, he could not see or feel, and vice versa. We believe that, on the contrary, in the absence of an effective neural filtering mechanism, the nervous system of the autistic child shuts down against flooding by overstimulation that is dysphoric to the child. Disturbed patterns of learning and performance arise from this background. This does not mean that learning cannot be accomplished, but it can only be successful if the special adaptive abilities of the schizophrenic are taken into account and utilized.

This list of schizophrenic responses that show evidence of having an evolutionary element is far from complete, but it serves to illustrate our belief that the schizophrenic to a very large extent utilizes responses to which we are all heir and some of which any of us may occasionally use to a smaller or greater degree. But the combination and habitual use of these evolutionarily earlier-developed neurophysiological responses in the schizophrenic makes him in effect a member of a subspecies whose behavior must be understood in its own terms of reference and studied as we study the behavior of other creatures. We should do well to take a leaf from the book of the ethologists and observe this behavior impartially and not judgmentally, recognizing what it actually is. If we were to do this we should see that many of the conspicuous "symptoms" by which we diagnose schizophrenia are but the normal responses of a being under the stress and the sustained and unrelieved frustration of an alien environment.

Similarities and Differences Between Schizophrenics and Normals

Let us now switch tracks and look at the schizophrenic with the eyes of one who is observing the similarities and differences between two closely related branches of the same species. When we first encounter a representative chronic schizophrenic we are aware that he is different from us in many ways. If we apply our hypothesis and assume that he belongs to another branch of our species, then he is in an alien environment and acts accordingly. Our olfactory sense immediately becomes aware of the typical "schizophrenic smell," and we remind ourselves that most mammalian species distinguish their own group from others by scent signals. The smell is unpleasant to us. It is difficult to define precisely, but it reminds us vaguely of stale sweat decomposing in unwashed clothes. Should we touch his skin (an action to be avoided, especially in an initial interview) we should find it cold and clammy. His posture displays diminished muscle tonus although, in a state of excitement, he may become restlessly overactive or even powerfully combative. His eyes are sometimes glazed, sometimes move in a saccadic manner, and usually avoid our own. Often his words are accompanied by a paucity or absence of gesture, although occasionally the extreme opposite is displayed. The content of his speech is largely unintelligible, although we can identify

most of his words or recognize the roots of his neologisms.

The average person seeing these strange manifestations will assume, if he is charitable, that the person showing them is "ill"; if he is hostile he will call them "mad." But we must ask ourselves whether this behavior is the schizophrenic's "norm" or whether it is a result of the interaction between the observer and the observed. Using the ethological paradigm, we remember that animals behave differently when watched through a telescopic lens from when the observing stranger intrudes into their space or puts them into a zoo. The question then arises as to how much our own attitude or presence influences the behavior of the schizophrenic.

Interestingly enough, we accept the idea of divergent behavior in groups of human beings widely separated from us in habitat and assume it to be "normal" for them. Thus we grant that an Australian aborigine may be adapted to sleeping naked in the open at near freezing temperatures, although we could not see ourselves doing so. Similarly we take it for granted that a pygmy's intelligence enables him to find his way in dense forest, stalk invisible animals, uncover hidden edible roots—all feats beyond and different from our own abilities. True, until recently we called such groups of people "savages," but we accepted their behavior as normal for them. Yet when an individual raised among us in our own groups displays sensitivities different from our own, we regard him as "sick" or "mad." What we must do is to establish whether this "deviant" behavior might be considered normal if seen within its own context.

Among us so-called normals, as we have mentioned, several of the schizophrenic's patterns are apparent, and some are not uncommon. This would include an occasional high degree of perceptiveness and sensitivity to environment. The difference lies in our ability to "switch off" when necessary and the schizophrenic's manifest inability to do this. However, in some extreme conditions even a normal may display behavior that has significant earmarks of schizophrenia—but we don't call it that. A graphic illustration of such behavior was given by Jim Phelan, an author, who spent 14 years in prison and who wrote:

The tyro in jail has not only to learn a new language and become adept in minor trickeries. He has to develop new senses, become animal-keen in a thousand ways not known to civilization. Long before the end of my second year I could tell one warder from another, in the dark and at a distance, by his breathing, by his scent, even by the tiny crackings

of his joints. Presently I could smell a cigarette in another man's pocket six feet away, hear a lip-still mutter in church even while a trained warder missed every sound. From the way an official clears his throat a long-term prisoner will know whether that man is likely to report him for smoking half-an-hour later—a long-sentence convict is not a person; he is an alert, efficient and predatory animal. [J. Phelan, as quoted by Burton (1973), p. 1]

A Behavioral Continuum

As we have reiterated, there is no absolute or sharp line that separates the schizophrenic from the normal. Obviously there are those among us who show characteristics that lie between these extremes. An overview indicates a gradation of behavioral complexes beginning with the average normal and progressing through the sensitive normal, the hypersensitive, and the preschizophrenic before we see the full complement of schizophrenic behavior. Valid generalizations about any aspect of human behavior are notoriously difficult, but accepting this reservation we find that these types can be characterized, if somewhat arbitrarily.

The Average Normal

Not many studies have been made of the average normal type, but those that do exist indicate that they are practical, oriented to reality, good in manual skills and routine tasks, unimaginative, conservative, and attached to tradition, have a strong sense of parentalism, lack creativity, and prefer pastimes of a physical rather than of an intellectual nature. In short a stereotype emerges that encompasses the efficient technician and administrator, any whose skills require pragmatic thinking, as well as those characteristics that a sophisticated city dweller associates with a small town inhabitant (Murphy 1959).

The Sensitive Normal

The next of our categories consists of those individuals whose delay factor operates a little less effectively than in average normals. They are the sensitive normals, easily troubled, imaginative, and sometimes overreactive. Their filter for social stimuli is imperfect, but they can handle the excess load on their nervous system, albeit at a price. They often set limits they wish others would respect. They are particularly resentful of

unnecessary sensory overloading. A squeaky door, a squalling child, a dripping faucet, glaring lights, blatant colors, or ceaseless chatter can drive them to distraction. Some remain unrealistic dreamers with poor work records; some become engrossed in the creations of others in music, poetry, and other art forms; a few become creative themselves; and a very few emerge as the world's geniuses. All of them, even the uneducated, evince a high degree of perceptiveness to human responses. They differ only in the degree of skill with which they can express that awareness. The average normals accept them only if and when their work receives public recognition, and only then do average normals acknowledge that creativity goes together with behavioral deviation.

Understandably, these sensitives tend to congregate and to form their own social circles, and they in turn express contempt for the average normals and their ways. They are aware of their own perceptiveness, and they value a high intensity of this quality even if it causes them physical and psychological discomfort. Some use hallucinatory drugs to disrupt their neural filter mechanisms in efforts to enrich their perceptual experience. Unfortunately, their associative centers usually cannot integrate the chaotic inrush of the chemically induced sensory stimuli, and these stimuli give rise to only a spurious widening of their mental horizons.

While on the subject of the chemical alteration of neural responses, we cannot omit the role of alcohol. It is probably no accident that the discovery of the effects of fermented vegetable products coincided with the beginning of agricultural habits, since the intensified exploitation of the land led to denser populations. Since alcohol decreases receptivity to social signals, its use enables close congregations of persons to tolerate increased crowding without discomfort. Thus social drinking has become one factor in man's ability and tendency to narrow his necessary personal space.

The Hypersensitive

Further along the gradient are the hypersensitive—those who have little or no ability to dampen social stimuli. At this point sensitivity begins to become a handicap. The life style of a hypersensitive person is formed by the usual influences of cultural background, genetic factors, rearing methods, degree of intelligence, and so on, but because of a sense of being different the

hypersensitive may feel that they are of little importance to their social groups and therefore develop low self-esteem. This feeling is often reinforced by people with whom they come into contact and for whom their tendencies to isolation, apparent surliness or irritability and their poor work record are not exactly endearing qualities. In line with their low self-esteem they feel the average normals of their societies to be dominant, intimidating creatures. In much of the animal kingdom dominant and subdominant creatures can live within the same group because preprogramed ritual behavior automatically adjusts their relationships. The subdominant status of the hypersensitive and the preschizophrenic (that is, the schizoid or high risk personality), even if it is imaginary, makes him feel insecure. His nervous system, already handicapping him for social life because its low delay factor reduces its filtering capacity, is then subjected to chronic alarm as he senses hostility in others, further undermining his ability to cope with ordinary life. Sometimes a panic reaction ensues, converting this preschizophrenic state into one of decompensation.

The Schizophrenic

With all this in mind let us attempt to perceive the world through the feelings of the preschizophrenic and the schizophrenic. The average and the sensitive normals, and even the hypersensitive, are able to accept certain habits of social life for what they are—purely conventional formalities. The schizophrenics, and some preschizophrenics, however, with their comparatively unfiltered perceptions, are constantly aware of unexpressed nuances, and are unable to do this. For instance, to take a commonplace, everyday occurrence: A greets B with a warm “How d’you do” or “Glad to meet you,” and a short conversation ensues with each party giving every outward appearance of interest in the other. But the schizophrenic perceives something different. He “knows” via his own keen sensibilities that neither A nor B is interested in the other, that each feels some impatience—perhaps being a little late for some appointment. Such encounters, especially when they involve the schizophrenic himself, are recurringly distressing to him. It is painful to him that people habitually do not say what they feel or feel what they say. At all times he is a recipient of contradictory social messages. How can he tell what is meant? How can he trust others? He is in a constant “double bind,” and the world is a bewildering

place for him. We have to realize that not only the social amenities but also our jokes, proverbs, metaphors, and language itself are full of double meanings and nuances that disorient him. To subject him to the standard proverb test is to give an indication of our own general lack of understanding of his problem, and is an unnecessary hardship.

Some schizophrenics, slightly further along the road to decompensation, become aware of how much more they perceive than the average person. They then come to believe that they possess special gifts, that perhaps these gifts have a purpose, that they may have been chosen to rescue all those confused people who surround them, that the world is “crazy.”

On the other hand, although the perception of the schizophrenic is relatively unimpeded by the filter mechanism, in most ways it is qualitatively inferior to that of the “normal.” The schizophrenic either does not acquire or loses some of the latest evolutionary acquisitions of neocortical cognition, and in their absence he cannot accurately verbalize what he senses. He receives more information than the normal, but he is unable to handle that information overload. A “normal” can keep several thoughts in abeyance while pursuing one, and activate any or all of the others at a later time if he so wishes. For the schizophrenic this is a difficult or impossible task since, in the absence of the delay factor, all the associated thoughts tend to occupy the channels of expression simultaneously, and the combined messages reach the vocal chords for expression in words. The speed of contraction of the vocal muscles is the final limiting factor.

A source of a great deal of anxiety for the schizophrenic is his awareness of concealed agonistic reactions in “normals,” even though these are disguised by conventional attitudes and polite manners. To appear not to notice the concealed attitudes of another person even when we do glimpse them, as a matter of fact, is a part of good manners. But in many instances the schizophrenic is seriously disturbed when, for instance, he recognizes hidden rage, because it makes him fear for his life. He is unable to be sure whether these people are capable of violence or whether it is only a “social game” for them. He also fears that his own violence may be aroused and that his own loss of control might bring retaliation.

Our ability to disregard the concealed or semi-concealed attitudes of others is a derivative of what we have called the delay factor. The delay factor is also, as

we have suggested, a strong element in our ability to suppress reactions to crowding and to tolerate living at close quarters with others. The schizophrenic, possessing the delay factor in a diminished degree, is distressed by close contact with others and attempts to withdraw or isolate himself from it. When we impose group living upon a schizophrenic we are forcing upon him a type of life for which he is not biologically adapted and he manifests what seems to us to be aberrant behavior, in much the same way that an animal we confine to the close quarters and alien environment of a zoo exhibits behavior and functioning that it would not manifest in an environment congenial to it.

Of great interest in this regard is the fact that although schizophrenia has been thought to be a universal disorder, recent field investigations indicate that it does not occur in tribal societies until they come into contact with Western customs (with the exception of some organically caused incidence). Indeed, several field workers have reported that the incidence of schizophrenia in tribal societies has a direct relationship with the degree and length of contact with modern life (Torrey 1973). An extremely telling example is the enormous increase in alcoholism, suicide, and mental diseases in the Eskimos, none of which conditions existed before it became Canadian governmental policy to integrate the Eskimos into the general stream of their national life. The Eskimos' introduction to a way of life to which they are not neurophysiologically adapted has obviously created stresses that are expressed in this way. Schizophrenics, also exposed to close-living, technological societies that they are neurophysiologically ill equipped to confront, respond with stress symptoms if they are prevented from distancing themselves from their environment.

Implications for Therapy

How can we view prevailing therapeutic practices in the light of this hypothesis, and what, if any, new approaches could we derive from it?

The psychopharmacological approach in effect attempts to bolster the delay factor by the administration of tranquilizers, sedatives, and so on. These, however, are crude instruments that in their present form cannot replace the delicate balancing mechanisms at the synaptic junctions that constantly adjust the organism to its moment-to-moment social stimuli. This

does not mean that further refinement in the long run might not prove helpful.

The use of behavioral modification has its place, but it can be criticized for selecting arbitrary target behavior that often is not in keeping with the adaptive capacity of the patient and may reflect only the cultural bias of the therapist. The question here is, do we modify the behavior of schizophrenics in the same way that we train circus animals, so that they can function in our society according to our standards, or do we find an environment that is suitable to a schizophrenic's adaptive abilities? We could take a leaf from those high-risk offspring of schizophrenic parents who manage to function successfully by choosing vocations that isolate them, such as nightwatchmen, field naturalists, and fire-watchers, in all of which categories we have seen examples.

To return to the behaviorists, one recently developed procedure that has proved successful by their standards (insofar as it has helped to empty hospitals) is the token economy method. The results achieved by this means are not unlike the operant conditioning of laboratory rats or trained animals, but they tend to be short lived, often disappearing when the patient is returned to his family and to his community. We ourselves have seen the glaring difference between those we have channeled into solitary occupations to which they seemed suited and the operantly conditioned, deemed successful, and discharged into the community. The first were comparatively fulfilled individuals and the latter living automata.

So far as psychotherapy is concerned, we have to recognize that the personal qualities of the therapist are of more importance than whatever theories he holds or school he follows. A keen perception of the schizophrenic's underlying motivation is of the essence; the psychotherapist must accept the patient's reality so that the amelioration of his condition becomes a collaborative effort. In treating a schizophrenic patient, the therapist should adjust himself to and, wherever possible, adopt the pattern of communication of his patient. This usually requires slow and unemotional verbal delivery and short, unambiguous sentences dealing with one thought at a time. Eye contact should be minimal. Once sound trust has been established, then, and only then, can the therapist instruct the patient in the basic elements of the "normal's" social interaction. The therapist explains the selection of various psycho-

logical masks for different occasions and the use of conventional statements that do not reflect true feelings. In this way, he can sometimes get the patient to understand and accept the social amenity of apparent insincerity. In a manner of speaking the therapist introduces this "alien" to the unwritten laws of our society instead of offering him a printed form that would give him an idealized, actually nonexistent, version of the "normal's" behavior. He teaches the wisdom of the Roman who said, "Mundus vult decipi ergo decipiatur."

These remarks are not made without having tested this approach with a sizable number of patients in the course of private practice. It was an approach suggested by the fact that a surprisingly large number of often severely shy, withdrawn, awkward, and easily embarrassed adolescents among them took up acting as a career. It seemed paradoxical that a profession that exposes its practitioners to possible embarrassment and to the severest critics should attract such emotionally handicapped people; yet a closer look revealed depths of self-understanding in that choice. In acting they are able to try on masks that permit them to relate to fellow human beings. Frequently beginning to come for therapy in their late adolescent years, these young actors and actresses displayed admirable sophistication while on stage, having acquired the skill of putting on a mask, but in their private lives in marked contrast they were withdrawn and experienced great emotional discomfort.

In concluding, we should like to emphasize that in this comparatively short article we can submit only a bald skeleton of our own conclusions on a highly complex subject, without attempting any survey of previous contributions or presenting rapidly proliferating findings from the fields of comparative biology, ethology, and social psychiatry—to name but a few of the many contributing sciences.

Tinbergen and Tinbergen (1972) have written, "We should try much to understand the state of adaptedness and the process of evolutionary adaptation, if for no other reason than that this has led to the structuring of our behavior." We can only add that a knowledge of the evolutionary elements that underlie many of the schizophrenic's expressions permits a flexibility of approach that does justice to the nuances of their personalities and, above all, offers a biological explanation that does not have to advocate metapsychological concepts to fill the lacunae of our understanding.

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