evolved while in the more withdrawn state. Whether these new patterns of behaving are judged as creative by society depends upon their functional utility under altered circumstances, or whether they may contribute to producing altered conditions deemed desirable by society. From the point of view of augmenting the prevalence of creativity, the concept of mental health must incorporate the desirability of fostering the shifting up and down the scale of velocity, even though this may involve some expression of behaviors judged undesirable from other points of view.

THE "MYTHEMATICAL" SOCIAL POOL GAME

Although considerable empirical data buttress the concept of velocity, we may appreciate its origins and implications better by examining a diagram of the "mythematical" social pool game, a crude representation of a more complex mathematical model [9].

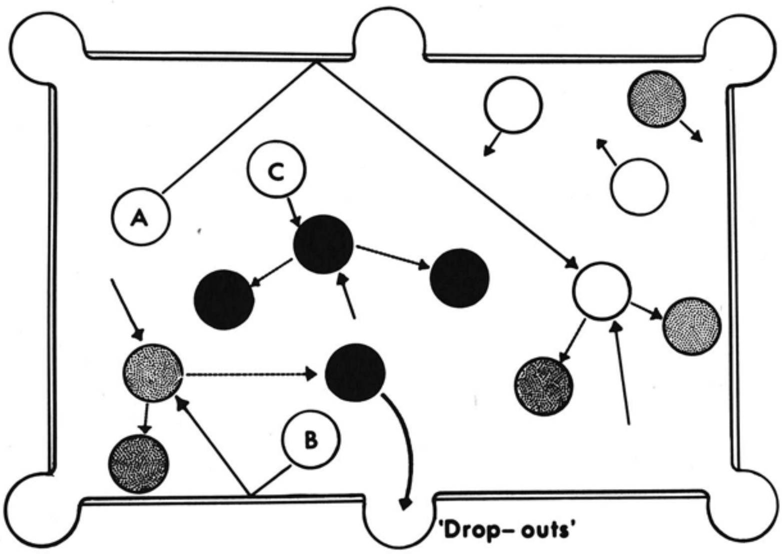

FIGURE 5 - THE "MYTHEMATICAL" SOCIAL POOL GAME

Consider several billiard balls on a table (Figure 5). Each has certain attributes. Each moves at a constant velocity, as if propelled by some inner force. The physical diameter of each is equal to that of every other ball. All move within a fixed space or area. How often one ball will on the average collide with another will depend upon these three factors, velocity, diameter and area, in relationship to the number of balls present in the area. Furthermore,

“Need state” == PKS: “Value”
“Frustration” == negative emotion

each ball from time to time develops a need state for contacting some other ball in an equivalent need state. Ball "A" with a bent arrow indicating its path of movement represents such a ball in the need state of encountering another ball in a like state. As shown, it does encounter such a ball. Each then gains from the encounter; each enters a state, which may be designated as gratification, that lasts for some time after the encounter. Residing in this state of gratification is indicated by the balls becoming stippled. After a specified period of time elapses, each of the stippled balls will complete its stay in the gratification state and return to the state of needing further contact with other balls.

One such ball, "B", by chance encounters a ball which is still in the gratification state from a prior satisfactory encounter. This latter ball remains uninfluenced by the encounter with "B"; it remains stippled. However, its failure to interact appropriately to the needs of "B" transforms "B" into a state of frustration indicated by the ball becoming black. In like fashion, when another ball, "C", meets a ball in the frustration state, it too will be thrown into the state of frustration, in which it will remain for some period of time before returning to the original need state for contact. At all times every ball is in one of three states: in need of contact, gratified from a satisfactory contact, or frustrated from an unsatisfactory contact. Purely by chance some balls will be frustrated more often than others. The more these balls are frustrated, the more they will try to escape from the field, the area within which meaningful contacts might occur. They seek the side pockets of their area of habitation. Here they are not visible to view; their "dropping out" leads to a lowered estimate of their velocity in terms of the total path traversed in the contact opportunity area over extended periods of time.

Furthermore, we can assume other attributes of these balls. Each contact involves a particular repertoire of actions by each contactee toward the other, if the one or both in the need state for contact are to be rewarded, i.e., to be precipitated into the state of gratification. When any ball in a need state for contact is not responded to appropriately, because the ball it contacts is in a refractory state of gratification or frustration, it will by this inappropriate response not have its own actions rewarded. As a consequence, its behavior will become somewhat deviant as it emerges again into the need state for contact. Thus, in proportion to the number of frustrating experiences to the number of gratifying ones, a ball will exhibit more deviance of behavior as frustrating experiences increase. As a consequence, the members of the group will vary with respect to both velocity and deviance of behavior.

Two other variables are involved, the intensity or strength of contact and the number of individuals inhabiting the area. Now let us assume that the balls have acquired the property of replicating themselves and of possessing a mechanism for passing to succeeding generations properties which will increase the likelihood of expression of appropriate behavior. The most important of these relates to the intensity of involvement at the time of contact. Depending upon the number of balls in the area, there is a specific intensity of contact which will maximize the amount of time spent in the state of gratification. This arises from the property of duration of remaining in refractory states of gratification or frustration being proportional to the intensity of contact. There is another peculiar consequence of life within such a system of contacts: balls will attempt to maximize the amount of time spent in the state of gratification. This attempt has the consequence of producing an equivalent amount of frustration. Since this is the nature of life, the genetic basis of physiology for its proper functioning comes to demand experiencing of equal amounts of frustration and gratification. Alterations from optimum group size, that is any change in the number of balls on the pool table of customary size, leads to an imbalance in fulfilling these two needs. When too few balls are present, the average ball will experience too little of both gratification and frustration. When the number of balls in the area reaches the square of the optimum number, every individual will essentially be frustrated as a result of every encounter since every other ball is essentially always in a frustrating refractory state. In this situation, every ball will develop maximal withdrawal, maximal reduction of velocity. No ball will have any awareness of any associate, even though they are crowded closely together. So far our experiments have not fully validated this conclusion, but they point in the direction of its correctness.

We call such balls by various names. Some are called mice, some rats, others man. Even fairly casual observation of such balls, each with its species-specific attributes, confirms the general validity of the above formulation. I call such simulations of more complex phenomena "Mythematical Games". This term reflects a core conviction of mine--any particular expression of behavior as a sample of a wide range of possible variation is relatively meaningless, and even unintelligible. True appreciation of individual isolated episodes comes only from viewing them against the backdrop of a conceptual formulation never ever expressed as such. In this sense the concept is a myth which forms the only reality.

In a later section we will need recourse to a simple expression of one aspect of the above mythematical formulation.

Let: A = area inhabited by N individuals

v = average velocity of an individual through A

d = target diameter of an individual

Where the individual is considered as a ball the target diameter is simply the diameter of the ball. In general, d encompasses any attribute which biases the probability that an individual will be detected and contacted by associates.

μ = communication constant reflecting the likelihood of contact

Then: $\mu = dv/A$

when a species is in evolutionary equilibrium

$\mu = 1.0$

that is to say: $A = 1.0$ and both d and v have the value, $(A)^{\frac{1}{2}}$. Each will change over time symmetrically with A. When I say that a species is in evolutionary equilibrium, I mean that there is an optimum number of individuals inhabiting each unit of area, A. As a secondary abstraction, and a more meaningful one, evolutionary equilibrium connotes an appropriate number of contacts per unit time per individual to maximize gratification, and as a by-product to produce an equivalent amount of frustration.

THE CONCEPT OF THE OPTIMUM (BASIC) GROUP SIZE, N_b

The previous formulations indicate the necessity for a constant group size inhabiting a particular sized area. When we look across the many species of mammals surviving today, there is obviously a wide range of optimum group sizes. Some species customarily lead a fairly solitary way of life, others live in various intermediate sized groups, and some form very large aggregates. However, there is one particularly common optimum sized group which demands our attention. This is the one consisting of 12 individuals. We have to look far back into the roots of mammalian evolution for its origin, although much of the picture I will develop may be seen in contemporary species which reflect earlier evolutionary stages.

In Figure 6 each dot represents the center of the range of an individual mammal of any species which has the capacity of establishing a single or several closely neighboring homesites. For simplicity's sake, let us think of a single homesite in the exact center of each individual's range. If we take any typical individual and represent the extent of its range by a circle, it may be seen that the range of every individual will overlap those of several associates. The reason for this lies in certain peculiar properties with which every individual moves through its range and responds to resources located in it. Many excursions terminate near the central homesite. Per unit area, fewer and fewer terminate at increasing distances from the range center. Were individuals maximally antagonistic, to the