Teamwork As A Dynamic System

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Teamwork as a method has been so logically appealing and so seemingly an obvious solution to the "whole man" commitment as well as to the issue of specialization, that the practice has developed without sufficient examination of the premise. Convictions of its value have come chiefly from clinical therapeutic experience and by inference from the many parallels of team operation in business, technological and scientific endeavors.

This paper is one of a series which has attempted to define the nature of clinical therapeutic teamwork (*9–14*). It makes no claim of scientific justification but endeavors to explore some facets of the problem from a descriptive point of view. An effort has been made to interpret the team approach by simple comparisons with more organized and mechanical structures.

Logical Basis for Team Approach

Before a discussion of the major thesis of this paper, one brief statement on the rationale for a team approach might be useful.

The logical assumption of a team is in the form of a simple but ideal equation which may be described thusly: the maximization of information, means, methods, and setting is more likely to supply the maximum product which is the most accurate diagnosis, prognosis, and treatment.

The information is maximized by assembling as many different disciplines as may be useful to define the problem, and by acquiring additional information from the case history as well as family, employer, and referring source, and indeed from any medium of knowledge that may be pertinent.

Maximizing the means is accomplished by a variety of interviews, examinations, observations, laboratory tests, medical clinical tools such as blood tests, electrocardiograms, neurological tests, and many others as well as by applied tolerance tests such as exercise, range of motion, etc., and furthermore by psychological and vocational testing among other means.

Maximizing the method is achieved by a housing in which the patient and team members are available to each other over a period of time and in which various observational opportunities are afforded to the team (*15*). This is a setting, furthermore, in which the team conference or staffing and other formal or informal meetings are but some of many relationships that exist for communication.

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This entire plan should give us the best chance for comprehensive and accurate results insofar as present professional knowledge and facilities permit. It is ideal but presumably the closer we approach, the better the result.

Teamwork as a System

Teamwork is a system. It is a complex organization of information with a structure directed towards its purposes and goals. It is effective not primarily because of the quality of its individual components but to the extent to which each component is complementary to, contributes to and mutually enhances each other so that its main purposes and goals may be achieved. I have defined it earlier (*9*) as

> ... a close, cooperative, democratic, multi-professional union devoted to a common purpose—the best treatment for the fundamental needs of the individual. Its members work thru a combined and integrated diagnosis; flexible, dynamic planning; proper timing and sequence of treatment; and, balance in action. It is an organismic group distinct in its parts, yet acting as a unit, i.e., no important action is taken by members of one profession without the consent of the group. Just as the individual acts as an interrelated whole, and not as a sum of his characteristics, so must the professions act, think, interpret and contribute toward a diagnosis which is the product of all, and a treatment plan which is dynamic to accommodate the changes which a dynamic human organism is constantly making.

This paper offers teamwork as a cybernetic, organic system in order to stress the parallel between the organic human being and the organic nature of a team process. The word "cybernetic" is chosen since if the team is to operate effectively it must have, somewhat analogous to the electronic computer, a structure which makes input valuable, which is self-correcting by feedback, and which is designed to control sub-systems effectively in terms of their relationship to each other and to the purposes of the whole system.

Gray (*4*) gives us a simple example of the significance of organized relationships. If a televsion set was disassembled into its components by a curious primitive tribe seeking to find out its function, the result would merely be various piles of conductors, resistors, and capacitors. They would have no comprehension of its purpose or the system. He says also:

> ... the living organism ... is a self-maintaining, self-regulating, self-adapting, self-operating, self-reproducing system ... the very secret of life is organization.... The living organism is a hierarchy of control system organized at a succession of levels. Each component is both a sub-system in itself and an element in a supersystem.... At each of the living levels of this series the components are organized as control systems. If the organism is to survive, none of these systems can run rampant; each must operate in the interest of the whole.

In the team process, each profession or sub-system functions with the patient independently. In most instances a fairly correct understanding

of the patient from a unitary standpoint by the given professional is reached, but this unitary approach can be in considerable error. While some facets are relatively definitive, the complete picture is a tentative one which awaits the influence, moderation or correction by other sub-systems and thence by the integrand of the whole system. In a team relationship the entire set of disciplines operate, as the process continues, on a constant self-correcting path towards increased accuracy of diagnosis, prognosis, and treatment.

The First Stage

The entire process begins with the information obtained from the case history and interview. Regardless of interviewing skill, the problem of inaccurate, missing, and contaminated information is the first point of correction. Data obtained from the patient and from professional sources may be outdated, narrow, incomplete, wrongly interpreted by the referral source, or erroneous. Individual disciplines which may be involved in the interviews may be fooled by some of the information because they are not sophisticated enough to evaluate it. The team, however, will see clues and inconsistencies not ordinarily apparent. The team soon finds that information from other sources especially from individual professions needs careful check and interpretation because such professions have operated with narrow, ad hoc purposes and with different philosophies. Furthermore, acceptance of such diagnoses can be dangerous. While this may be quite safe for the simple case, the team deals with complicated cases. Cardiac Work Evaluation Units (a specialized team for the cardiovascular patient) have found, for example, that as high as 24% of *diagnosed* cases of heart disease was without organic foundation (*2*).

Testing instruments are frequently unreliable for they are subject to variation inherent in the device itself, to technical errors of function, to observational mistakes, misinterpretations and distortions, and also may be considerably affected by the emotions of the patient and his reactions, as well as by other circumstantial factors (*12*). Consequently, in an effort to reduce errors and to gain the additional insight to personal observation of the test, it is wise to repeat or to implement most if not all previous tests.

Equilibrium Needed

While each profession is a control system in itself, it operates under the hierarchy of the total system. If it is to be effective, the quality of the organization of the process is vital. One need not fear organization, which is intelligence applied to structure, as long as the personnel bound by such arrangement are free to continually evaluate the structure. "The art of progress," said Alfred North Whitehead, "is to preserve order amid change and to preserve change amid order." It must be a dynamic process in which individual freedom and planned order are in equilibrium through frequent examination. Order itself is frequently only a temporary measure subject

to its proven efficiency. Consequently the team needs to schedule regular sessions to examine and to discuss its operation apart from sessions that specifically focus upon patient care.

Homostasis is related to efficiency. The group, or total of sub-systems, is a homostatic device for balancing and relating the specific sub-systems or professions. If one sub-system is permitted to dominate, it tends to shut off the output of other systems as well as to choke the input of its members. Furthermore, responsibility begins to pile up and overload the dominant sub-system. There are, of course, better, less mechanistic interpretations of what happens to individuals and to the group under authoritarian control.

I have used the concept of "therapeutic modulation" as one which implies greater control by one sub-system coincident with certain patient needs in which one profession is required to assume more control temporarily. This is obviously advisable, for example, in emergency medical situations but permissible on other occasions, as for example, when an exceptional opportunity for employment arises which must be immediately followed. However, in every instance the team member bears in mind the previous team opinions about the case.

Besides homostatic control there are two important factors promoting efficiency—the quality of the input and of the corrective feedback. A faulty structure, without sufficient input of information and with a poor corrective feedback, tends toward entropy or loss of organization. This creeps in without our awareness as we become inured to the system. Wiener (*18*) states:

> Just as entropy tends to increase spontaneously in a closed system, so information tends to decrease; just as entropy is a measure of disorder, so information is a measure of order.

Development of Input

The team needs input from a variety of avenues: educating its members, incorporating new scientific findings, obtaining ideas from comparisons with similar or comparable teams, the following through of cases with feedback, and instituting good communicative practices all provide indications for restructuring and reordering the system.

The team must be sensitive to the limitations of professional knowledge not only of its individual professions but of its entire collective system and plan for amelioration. Furthermore, individual disciplines need more information about each other in order to relay information in the most appropriate way.

A studied effort therefore ought to be made to increase the competence of individual members. This is obvious when one has a highly specialized team such as the "cleft palate team" or the "cardiac work evaluation team," but it is true of all teams. The specialized knowledge of each member needs to be augmented by a deliberate scheme which would upgrade each member about the particular nature of a disease or abnormality. For instance, in

the case of the physician who has expert knowledge of the medical situation per se, it is evident that what he needs is more information and insight into the social, emotional, psychological, and vocational relationships of impairment and especially specific impairments.

The communication problem will always represent one of the major barriers. One of the most important differences, that of basic philosophic and professional outlook, may be eased by an exchange of at least the fundamental reference points of each other's disciplines. Such insights result in better questions being asked of each other. This internal stimulation not only keeps the individual professional more alert in his thinking but arouses ideas which reshape his professional views in new arrangements.

Really, how many of our treasured postulates are authentic? A professional area ordinarily does not continually review its assumptions. It acts generally resistant to new information which does not fit its own conceptual pattern and which often comes in modes of expression which do not conform to the set and language indigenous to the profession. Yet, this protective cloak which attempts to preserve ideas and to routinize work needs disturbance.

We are all, in a sense, in considerable error just by entering the intrinsic orbit of a profession, for we have selected a system which is only a partial explanation, a particular aspect, a limited view of human beings.

Let us consider the psychologist as an example. The ideosyncratic nature of psychology often leads to becoming fixated upon a mental function paradigm in such a way that the reality of the biochemical basis of the brain, which operates in a reciprocal relation with other organs of the body, is forgotten or rather not understood or appreciated (*3, 5, 16*). No doubt the rather mechanistic approach of medicine is a parallel in the other direction. Present day knowledge, in the absence of a better interpretation of the human complex, forces us all into assumed matrices as the more efficient way of dealing with an enormous amount of information. One's only recourse is to be open to new values and new knowledges that are particularly appropriate to one's setting and specialty. The child psychologist may not need to keep up with the whole field of psychology if he works in a child guidance center. The industrial psychologist in his milieu, for example, must keep up with a great variety of new information about work, energy costs, cultural changes in attitudes towards work, and a relatively new trend in management—employee relationships. Some knowledges may be strictly in the field of psychology but often they should not be. Unless one constantly acquires such allied knowledge, it may lessen the quality of one's specific professional service.

Broad Knowledge of Team Disciplines Necessary

Wiener (*19*) says that if the solution of a problem in one field really lies within the area of a related field, ten people are no better than one, unless

they know something about the related field. Consequently, efforts to educate each other should be part of the contribution of each field to the team system.

While such a practice has drawbacks with authoritarians who are convinced that increased acquisition of knowledge gives broader perogative, and we have seen this occur, yet the value of this exchange is too great to be missed and usually it results in greater respect for each other.

This issue brings up the question of overlap. Frequently the answer to fear of overlap of functions is to draw up a document giving various descriptive lines and regulations. This solution is not the answer. There are obvious advantages in generally defining function and responsibility and it should be done, but the assumption often seems to be that knowledge is clear cut and that a certain discipline must perform in one way. First of all it would be disastrous if a good deal of knowledge did not "overlap" for it would be difficult to exchange information without sufficient common reference points. Secondly, we as individuals are something other than a textbook definition of our discipline. If one member of the team has a very exceptional skill along a certain line, or somehow has a special tie with the patient (perhaps speaks the patient's language, etc.), in the best interests of the patient, out-of-ordinary arrangement of responsibilities must be made to fit the circumstances of each case; this is frequently referred to as therapeutic modulation.

One simple method of input might be to invite a qualified professional person, whether a counterpart of a present discipline or a new one, to sit in with the team and to encourage him to ask questions. The result may be a fresh input which could break the routine. It is also helpful to study the way other teams operate, not only similar teams to one's own, but those with other emphases and in different settings. Of course it would consist of more than attendance at a team meeting. Interviewing the members individually, as well as inspecting other routine and non-routine procedures, could be profitable.

To stress an earlier point, it is salutary to schedule educational discussion sessions for the exchange of knowledge, because they provide a release valve, as well as an oscillation from center, that may lead to better focus.

Feedback

Wiener wrote: "Feedback is a method of controlling a system by reinserting into it the results of past performances" (*18*). Human intellectual frailty and human propensity for illusion being what it is, we need to thoroughly examine cases at specified periods regardless of apparent need. This review, while primarily for the patient's benefit, must also be seen as a means of clarifying original opinions and of seeking insights for reasons for variance and discrepancies.

Another source of return is to build a broad spectrum of case experience.

Even mild cases may be profitable, and certainly, severe cases (that is, those with a high probability of failure) are both learning opportunities and tempering experiences. Of course some anticipated defeats do not materialize. On the other hand "failure" is a time waster unless maximum intellectual profit can be derived from the episode. It can also be a disservice to the patient with the raising of false hopes. However, usually patients feel they gained although the team may not think so; in any case, the patient was given a chance for improvement which he may not have had otherwise.

Besides the opportunity to analyze the failure itself, there is the chance to investigate the errors of estimation in the anticipated "failure" which becomes "successful" as well as the factors that made for "success".

This spectrum of degree of difficulty also serves to place cases and their problems in a more realistic evaluative level and to acquire thereby better differentiation. Similar advantages also accrue if factors of age, sex, social background, education, and other patient aspects are a part of the distribution.

Besides the current experiential feedback, which is the usual return, the feedback can be immensely improved if the case is followed. Not the usual, somewhat casual, follow-up, but *followed through.* This effort should be considered as an *integral part of the clinical process* not only for the patient's possible ameliorative or corrective benefit, but as a means of improving and correcting the system. The human desire for achievement means that the team may close a case with a sigh of relief and unconsciously resist the disturbing reality of what may happen later. "We are satisfied now; please do not deny our triumph." Short-term follow-up lightly touched is the usual response to allay one's guilt.

Furthermore, "success" is often measured too simply. It isn't just that the patient is doing "fine"—but fine in what way, and to what degree. It is obviously impossible for a team to do everything for the patient (to deliver the theoretical maximum) but it should know how far below this ideal is being delivered, as well as the predictable and unpredictable degree of achievement. While it may be more satisfying to set up and to achieve immediate treatment goals, such accomplishments are measured with greater accuracy by the longer term and if possible by life term review (*17*).

Perhaps a more objective approach is to rule out "success" and substitute, or at least add, the relative degree of attainment of objectives. The team has available to it all too many "excuses" for failure. These most often turn out to be such reasons as: the client's case was severe, he was recalcitrant, modern knowledge is inadequate, or it was the fault of unforeseen, unanticipated circumstances. True, the typical success-failure formula is evidently more comfortable under our present modes of conduct, but its discard may be a means of improving performance and increasing responsibility.

It is vital to such a "continuum of attainment" approach that the philosophy be well defined and the general objectives and commitments be stated in written form. In individual patients the specific objectives for the patient need to be recorded as a basis for determining how well they were satisfied. The lack of such degree of attainment is not the "fault" of any one member but of the *whole* team.

Information Exchange

The transmission and exchange of information between the sub-systems is essential to what is, of course, communication. A high quality of this function is vital if the system is to make the correct decisions. The issue is complicated enough under ordinary circumstances since it has its mechanical, semantic, philosophical, syntactical, linguistic, and non-verbal aspects among others. When we have in addition an interprofessional group managing severe cases with all kinds of intricate human involvements, the problem is indeed a complex one.

Putting aside the question of the willingness to communicate, and the motivation to relate to the ideas of others, and some people are unprepared to do so for various psychological reasons, there is the practical problem of interdisciplinary interpretation.

Treading the appropriate path between the more objective measurement tools, scaled opinions and classifications systems, and on the opposite extreme, discursive statements; between the categorical minded professional and those who stress clinical impression; and between the mass of scientific evidence on the one hand and the guesses, hunches and hopes on the other, is almost impossible. The choice is not dichotomous; both sides are accepted without forgetting the limitations of both and the shortcomings of one method without the other. Consequently, each professional should endeavor to utilize as many avenues as he can for his own understanding and because it may help him communicate.

There are various objective or semi-objective scales of measurement available, particularly in medicine, but each profession needs some kind of scale and should be obligated to devise some such instrument as less subjective reference points for future estimations of change. Some psychological tests are also useful in this regard. Education offers a good example in the reading test with equivalent forms related to grade levels.

The reluctance of some professionals to use such classificatory devices is understandable. Criticism is usually on the basis that the instrument may be somewhat unreliable, doesn't tell the whole story, may be misused or misinterpreted, and that it tends to take the place of clinical judgment. All of these things are true if we permit them to be so. Yet, no one expects the professional to rely completely upon these means but merely to use them as an aid and supplement within the bounds of clinical estimations. It is an attempt to resolve the plain and simple fact that we tend in time to make accommodations to the patient's difficulties un-

less we have some kind of external criteria. A phenomenon is seen in a rehabilitation center in which sometimes the reality of the severity of the case becomes lessened as we understand him better. On the other hand, in certain instances, for one reason or another, we may tend to depreciate certain individuals by an unconscious personal bias and if we can be helped by a formal scale of measurement, we may be more objective.

As with all communication systems, a sufficient redundancy of message needs to be a part of the process. The professional therefore needs to state, restate, and provide examples and illustrations of his opinion. There are both values and drawbacks in such extensions. On the plus side, one may see a situation better oneself by the disciplined effort of a simplified detailed interpretation, but on the other hand, it may tend to distort one's own opinion by its artificial enlargement.

It is clear that reporting of this nature is not of the same character which one could make without embarrassment in speaking with one's own profession, for some details would not be given, while certain nuances could be. The professional must realize that he is serving the internal knowledge of the team.

Patient Comparison Useful

Using former cases for comparison can be helpful to understanding. This is one of many good reasons for continuing an unbroken team membership since, in frequent turnover, the team's historical experience is lost and the whole relationship structure is altered.

For example, one might say that Mr. Brown is anxious, but it is apparent and on the surface and not as severe as in the former patient, Mr. Smith, who exhibited this anxiety in a covert way. Or, one might say that Mrs. Jones may not have the quick wit of Mrs. White but is actually more intelligent and planful. Mr. X may be an older man than Mr. Y but he has made an excellent physical recovery to his coronary. He can go back to his former job of rather heavy work to which he had been accustomed; but Mr. Y has never had anything but a desk job and must be more careful of his non-work stresses. Miss A and Miss B have much in common (early polio) and they are about equal in physical severity of disability, education and intellect. However, Miss A was brought up in an overprotected situation, has subsequently been quite dependent, and the present possibility of marriage is very upsetting to her and will prevent her from taking certain constructive actions at this time. Miss B however had to make her own way all her life and, consequently, the crises she experienced recently was met with strength.

These oversimplified examples are meant to imply that when comparisons are made with another case with which the group is familiar, a whole volume of experiences is recalled and better questions can be asked by the listeners as to whether such and such differences and similarities

might be anticipated. There surely are dangers in this method, but it is up to the interpreter, as well as the team, to limit conclusions to the specific items of comparison and to avoid extended parallelism.

In a somewhat comparable way to the binary dichotomy of the yes-no of the computer, a member might supplement his report by as many yes-no questions as he can think of that may be interpretative. This is a theoretical ideal in which a maximum of yes-no questions would maximally transmit the opinion. Usually however a selection of general key questions, as well as those questions that may be of more particular use to a given discipline, would not only be informative and anticipative of questions, but might evoke an issue not previously considered.

Einstein said "imagination is greater than knowledge" and while scientifically we should limit our interpretation to the facts, yet one should have the courage to speculate and give impressions and hunches, but of course make clear what one has reasonable evidence for, and what is supposition.

A team with a good "climate" tends to develop, and certainly to encourage, professional creative imagination, but one with a poor atmosphere (sometimes because of an authoritative cloud) forces the members to be protective of their statements and to limit their opinions.

The Specialized Team

The discussion up to now was primarily concerned with the large comprehensive team that deals with multiple disabilities in a broad treatment setting. Do smaller specialized teams have a place? Not only do they have a place for those with essentially single severe disabilities, but they have some advantages. The specialized team is smaller, is less expensive, does not require an elaborate setting, and may work with the patient for a shorter period. Perhaps their chief asset is that, by their mere fact of specialization, they can exceed in many cases what a larger non-specialized team can do. For example, in the Cardiac Work Evaluation Team, all members are specialized in cardiovascular disease; that is, the physician is usually a cardiologist with an interest in work problems; the social worker is a medical or psychiatric social worker with a particular knowledge about heart disease and its social and emotional ramifications; and the rehabilitation counselor knows the relationship between various kinds of heart disease and employment. In the larger teams there are psychologists and psychiatrists who are expected to have some familiarity with heart disease. One significant observation is that with the experience of practice with the special case, the group becomes more and more competent to do that particular job than a broader non-specialized team.

The disadvantages are obvious: a possible decrease in the amount of attention to secondary disabilities or inability to deal with other major disabilities (orthopedic, neurological, blindness, and others) and lack of a substantial interval treatment setting and therefore lack of broad ob-

servational means. In some cases, the specialized team must refer to the more comprehensive team or to other community facilities for services beyond its scope.

Conclusion

A team system appears to be the best answer at this stage of therapeutic development for patients who require special treatment because of their complex needs. While the value of a number of different specialized services is evident and obviously beyond the scope of any one professional, the power of a team system offers service at a level above the mere collective contributions. As an exceptional opportunity for education and for enhanced knowledge and insight through communication, its individual members operate at a higher professional level than they could perform if they worked individually (*10*). When these professionals then combine in group decisions, a dimension is achieved beyond other present-day practices.

In time, such a system can become even more powerful when each profession will have the assistance of an electronic computer to stock a library of knowledge and to make comprehensive comparisons now beyond the ability of the short human biological life span. Such advances are already under way (*1*, *6*, *7*, *8*). The methods and techniques are available although as yet unrefined, insufficiently researched and inadequately experienced. The promise is there and indications are for extraordinary advances in the next decade.

Teamwork is a commitment to excellence which does not take the easy road of declaring cases as too severe or infeasible, which is not reconciled with palliative measures, which is not concerned about a high percentage of failures, which accepts the disturbing reality of long term follow-up, and which continues to pursue its objectives in spite of the utmost complexity of the human organism.

Summary

Since teamwork requires a number of professions to work together as a series of independent systems but yet dependent upon the total team system consensus, it is analogous not only to the organic integrated nature of a human being but the cybernetic control and operation of computer systems. Comparisons are made with some of the cybernetic functions such as sub-system relationship, homostatic control, input, and feedback.

The future improvement of the team will depend in part upon its use of electronic computers.

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