A CONCEPTUAL SCHEME FOR THE STUDY OF SOCIAL ORGANIZATION*

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IT IS the office of theoretical investigation," said Willard Gibbs, "to give the form in which the results of experiment may be expressed."[1] If he had put "observation" for "experiment," Gibbs would have stated the purpose of the present paper. It is to provide one form in which may be expressed what we know about social organization. Please note, at the beginning, that more than one form is possible and that, in a limited space, the one suggested here can only be sketched out.

In the field of social organization we now have a great deal of fact. We have descriptions of social groups of many different kinds, from primitive societies to modern factories and communities. Granting that these studies are not everything they may sometime become, many of us feel that they are closely observed and clearly described. We feel also that social groups, no matter how far separated in time or purpose, have certain things in common just because they are examples of organized human effort. We feel that in the necessities of organization itself and not in factors which are often treated as independent of organization: physical environment, racial heredity, the market, infantile experiences, or culture tone, must, in at least one instance, be sought the reasons for the differences and similarities between societies and for changes within societies. Here there are no primitive, industrial, religious, rural, or community sociologies; there is only one sociology—a sociology of organization. For an analytical science, any group is a microcosm.

We have a great deal of fact; we also have a great deal of theory. Some of it has been useful in describing particular kinds of social groups: it needs to be stated with full generality to apply to all groups. Some of it has been stated half-intuitively: it needs to be "spelled out." Some of it has been beautifully clear and explicit, but partial: other elements of theory need to be added to make a satisfactory whole. Yet, whatever the limits of particular statements, there have been signs of convergence, and the present paper tries to present a conceptual scheme toward which some of our theories may be converging. The paper only brings out what has been latent. It puts together things which have been lying around for some time in the literature. It is eclectic rather than original. It takes what it needs where it finds it.

There are signs of convergence. It might be faster if we learned from the experience of the older sciences. Here, stated crudely, are a few of the rules which this experience has shown to be necessary in setting up a conceptual scheme. They have to some extent, perhaps not sufficiently, guided the building of the present one:

1. Look first at the obvious in its full generality. Only then does science economize thought.
2. Do not use high-order abstractions until you have exhausted the possibilities of low-order ones.
3. Talk about one thing at a time. That is, in choosing your words see that they refer not to several classes of fact at the same time but to one and one only. Corollary: once you have chosen your words, always use the same words when referring to the same things.
4. Once you have started to talk, do not stop until you have finished. That is, describe systematically the relationships between the facts designated by your words.

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[1] M. Ruykeyser, *Willard Gibbs* (1942), p. 232.

5. Science consists of the "careful and complete description of the mere facts."[2] It drops the "why" and looks at the "how."
6. Cut down as far as you dare the number of factors considered.
7. Recognize that your description must be abstract, since it deals with only a few elements of the concrete thing. Recognize the dangers of abstraction, especially when action is required, but do not be afraid of abstraction.

Perhaps the reason so few of us carry these rules into effect is that they could not be better calculated to make our books and articles dull reading. We still work in the literary tradition, however badly we live up to it, and the rules of writing contradict the rules of theory-building at every point. In writing, the obvious, or what looks like it, is the thing you are most careful to avoid. Since it hurts to talk about one thing at a time, you use words which refer to several things at once. You also use different words for the same thing. If you do not, you lack variety. Systematic discussion, too, is notoriously repetitious, because the same things must be considered in several different connections. Finally writing is always concerned, and must be concerned, with giving a vivid impression of the concrete reality, and its success in doing so is the measure of its charm. The exposition of a conceptual scheme makes hard reading because it breaks all the rules of good literature, but only by breaking these rules and sticking to others will it become science.

The elements of social behavior. The present paper presupposes the direct observation of social behavior. It asks the devastating questions: Looking at the actions of men with eyes innocent of the usual preconceptions what do we see? What simple classification can we start from in this field of fact? Attempting to answer, it sets up, as components of the conceptual scheme, individuals and three elements or determinants of the behavior of individuals in groups, which will be called *operation, sentiment,* and *interaction.*[3]

In ordinary language, *operations* mean the things that men do: operations on the physical environment or on other human beings. The full range of actions included here should be noted. Eating, drinking, plowing a field, tending a machine, putting on a coat, dancing, performing a ritual, and of course talking, though talking gives rise to special problems—all these are labelled operations. What they have in common appears to be some use of the muscles of men. No word is more than a ticket, but the use of the word *operation* here has some drawbacks. It must not be confused with Bridgman's operational theory of concepts, and was chosen because other suitable words had already been taken up. *Work* has a special meaning in the conceptual schemes of physics and may sometimes have an analogous one in sociology. *Behavior* and *action* are perhaps better applied to the whole of which operations are a part.

The definition of *sentiment* is more difficult. If we consider what we mean by the word, all that sentiments have in common seems to be some connection with internal states of the body, not well described except for the grosser sentiments: Cannon's pain, hunger, fear, and rage. In sociology we do not observe sentiments but operations which we take to be manifestations of sentiments, in facial expression, in bodily attitudes, above all, in what people say. Upon the whole, though, throughout human experience, men have successfully acted on the assumption that they could infer the existence of sentiments from what they could see and hear people do and say, and this assumption will have to satisfy us here. Sentiments are a concession to common sense. Note again the full range of things called sentiments here: from fear, hunger, thirst, and lust to such far more complicated matters as liking and disliking for individuals, approval and disapproval of the things they do. The psy-

[2] E. Mach, *The Science of Mechanics* (1942 ed.), p. 190.

[3] For a preliminary statement see G. C. Homans, *English Villagers of the 13th Century* (1941), pp. 405 ff.

chologists do not use the word so broadly. The present use applies only to the present circumstances.

The behavior of a man living by himself would exhibit both sentiment and operation. What is it that makes behavior social? This element will be called *interaction*. When we refer to the fact that the operation of one man is followed, or, if you wish, stimulated by the operation of another, and so on in chains, entirely in abstraction from the particular operations performed or sentiments manifested, then we are referring to interaction. It may be especially difficult to think of interaction, consistently, as separate from the other elements of behavior, but it seems to be necessary to keep it separate and in much of our thinking we do in fact keep it separate without admitting as much.

Each of the elements named here has been used as a concept by social scientists. For instance, Roethlisberger and Dickson are discussing the Bank Wiring group at the Hawthorne Works of the Western Electric Company. They point out that the group held certain sentiments about such things as the restriction of output and go on to say: "It may be concluded that the individual's position in the group was in large part determined by the extent to which his behavior was in accord with these sentiments."[4] If you will examine what the authors mean by *position*, you may agree that they mean, in part at least, habitual position in the chains of interaction among the members of the group. By *behavior* they refer to the element of operation, and the word *sentiment* with its meaning are the same for them and the present paper. Further, they are describing a state of mutual dependence between the elements of behavior. One element does not vary in independence of the others.

Again, Roethlisberger and Dickson are describing the methods used in analyzing the behavior of the Bank Wiremen: "Each occurrence in which a person entered into association with another person was examined to see whether the relation thus manifested expressed an antagonism, a friendship, or was merely neutral." Here they are talking of the sentiments. They speak further of what they call *participation*: "Two questions were asked: (1) To whom do this person's relations extend? Does he associate with everyone in the group, or are his social activities restricted to a few? (2) Does he enter a great deal or relatively little into social relations with the people with whom he associates?"[5] Here the authors are looking at the extent and frequency of interaction.

By far the best discussion of interaction as a determinant of behavior is that of Eliot Chapple in a brilliant paper which is too little known.[6] The present definition has been taken from him. To him a more general idea can also be traced. It is not enough to discriminate once between the elements of behavior. It is still more important to keep them discriminated and never let the old confusion return. Unless they are kept distinct it is impossible to consider the relations of mutual dependence between them. The only criticism of Chapple which will be made here is that he stopped too soon and did not apply to the elements of operation and sentiment the kind of analysis that he applied to interaction.

Operation, sentiment, and interaction have been called elements rather than variables. For quantitative observation and mathematical treatment, specific variables must represent the elements. It is possible to measure the quantity of the operations of a group (through output records), the extent, frequency, and order of interaction,[7] perhaps even the strength of sentiment. Breaking the elements down in this way is one of the next steps to be taken in studying some kinds of social behavior. But a warning is needed. Sociology will miss a great deal if it tries to

[4] F. J. Roethlisberger and W. J. Dickson, *Management and the Worker* (1939), p. 552.

[5] *Ibid.*, p. 493.

[6] E. D. Chapple, with the collaboration of C. M. Arensberg, "Measuring Human Relations," in *Genetic Psychology Monographs*, Vol. 22 (1940), pp. 3-147. For the definition of interaction see p. 24. See also E. D. Chapple and C. F. Coon, *Principles of Anthropology* (1942), pp. 36-41.

[7] *Ibid.*, p. 25.

be too quantitative too soon. Data is not nobler because it is quantitative nor thinking more logical because it is mathematical. The old-fashioned naturalist, who only used his eyes, was also a scientist. The last emphasis is always on the immediate situation. Nothing which can illuminate it must be ruled out for doctrinal reasons, methodological or political. We shall be blind enough without wilfully narrowing our vision. At the same time, we do not have to learn the hard way. The older sciences have already struggled with the same general problems as sociology. If the solutions have been stated mathematically, they are not to be disregarded just for that reason. No matter where it comes from, we shall need all the help we can get.

There must be a number of possible classifications of the elements of social behavior. The one made here is crude but will be crudely used. It is designed to develop some of the more obvious generalizations of sociology and can be judged only by its usefulness for that purpose. Other men have used such concepts as *status*.[8] There can be no objection, provided the concepts are definitely related to observed behavior. But status, to stick to the example, refers, as commonly employed, to a complicated combination of the elements of behavior. Might it not be wise to establish the first-order abstractions before going on to the second-order ones?

One word about individuals, who are components of the conceptual scheme. It may seem too great an abstraction, but one of the assumptions which must be stated candidly is that physical and mental differences between individuals do not come into the scheme. The fact that a person is a male or a Mongol or an idiot is less important than the fact that he takes a certain part in cooperative activity. In the same way, the fact that he is a father or a president or a pope is less important than his position of leadership. For the purposes of the present conceptual scheme, a proviso which must always be understood, the differentiation made by organization is the only directly significant one.

The primary and secondary systems. In the present scheme, the elements of social behavior are described as mutually dependent in two systems, which will be called the *primary* and *secondary* systems. As usual, these words do not imply that the primary system is earlier or more important than the secondary. They are mere tickets, indicating only that it is sometimes easier to begin the discussion at the primary system. The words, with the insight behind them, come from W. L. Warner. For instance, he writes: "The economic life of a people is essentially concerned with relating the primary technological adaptation to nature and the community's secondary adaptation which is its social organization. . . . The tools and implements are formed into a general order of making and using to exact a supply of food and other creature necessities from nature, and they are then used by the population of a group in a systematized manner through a set of conventions and social usages which are dictated by the social organization. The social organization regulates the technology and helps discipline the distribution and consumption of its productivity."[9] This comes from Warner's description of an Australian black-fellow group, but he applies the same discrimination to a modern American community. In the first volume of the Yankee City series, Warner and Lunt write: "The type of behavior by which a group adjusts itself to, and partially controls, the natural environment is, as we have said, its technical system; the system of adjustments and controls of the interactions of individuals with each other is the social organization. . . ."[10] Here Warner calls the primary system the technical and the secondary system the social, but the more neutrally-

[8] R. Linton, *The Study of Man* (1936), pp. 113-131.

[9] W. L. Warner, *A Black Civilization* (1937), p. 138, also p. 10. A similar classification, in which the line between the two systems is not drawn as it is here, is found in R. LaPiere, *An Introduction to Sociology* (1946), p. 162-3.

[10] W. L. Warner and P. S. Lunt, *The Social Life of a Modern Community* (1941), p. 21.

colored terms may be preferable. The distinction appears to be the one Roethlisberger and Dickson make between "formal" and "informal" organization in a factory.[11] Their language is well adapted to industry but is misleading for the study of social organization in its full generality, since in many societies the thing which Roethlisberger and Dickson call "informal" is highly formalized.

In trying to bring out what is latent in Warner's words, this paper makes a further distinction. Put on one hand the environment on which a social group operates, and the plant and tools (including farm animals) with which it operates. Put on the other hand the organized human behavior which makes up the primary and secondary systems. All three items: environment, plant and tools, and systems of human behavior are important and mutually dependent in the concrete phenomena. Here, however, no systematic attention will be given to the first two. They will be taken as given in any particular instance. The picture is of an isolated system whose exchanges with its environment are known. This distinction is like the one Barnard makes between a "cooperative system" and an "organization," the latter being defined as a "system of consciously coördinated personal activities or forces."[12] Note that the environment is not always the natural environment of the biologist. It is always relative to the group considered, and may include human beings not members of the group. A law court is operating on an environment as surely as a primitive tribe.

Warner discusses social organization in terms of three systems not two. To the technical and social he adds the ideological, the last consisting of the intellectual schemes, the "absolute logics" by which men interpret their world to themselves.[13] The ideological system will not be considered here. In part it is determined by and in part it determines the form of the technical and social systems, but it is different in kind. What we observe of it consists wholly of what men say, write, or depict. Like the environment and the tools, it is of the greatest importance in the concrete phenomena and is left out of systematic consideration only to make the problem more manageable.

The description of the primary and secondary systems must begin somewhere, and it begins here with a group of individuals. A *group* is defined by interaction. The individuals A, B, C, D, E . . . are members, as we say, of group I. Within a given period, A interacts more frequently with B, C, D, E . . . than he does with M, N, L, O, P . . . whom we choose to consider outsiders or members of group II. B also interacts more frequently with A, C, D, E . . . than he does with any one of the outsiders.[14] And so on. It may be true that E interacts about equally with some members of group I and some of group II and so forms a link between groups. In any event, it is possible, merely by counting the interactions, to map out two quantitatively distinct groups. But note again that this definition of a group is entirely relative. It depends on the group you choose to consider. The United States of America is a group in the sense defined, a group of the sort we usually call a society. A society is divided into a complicated hierarchy of sub-groups, and any group with a population larger than two can be divided in this way into sub-groups.

The primary system. The primary system will be considered first and then the secondary. In the primary system, the elements of social behavior are represented as follows. The operations are the ones the group performs on its environment, with the tools at its command, as a result of its initial sentiments. For a primitive group, these are the operations of hunting, fishing, gathering, and the like, the punishment of crime, the

[11] Roethlisberger and Dickson, *op. cit.*, pp. 558-62 and elsewhere.

[12] C. I. Barnard, *The Functions of the Executive* (1938), p. 72.

[13] W. L. Warner and P. S. Lunt, *The Social Life of a Modern Community* (1941), p. 22; W. L. Warner, *A Black Civilization* (1937), p. 11.

[14] G. C. Homans, *English Villagers of the 13th Century*, p. 403. For a demonstration of the method see A. Davis, B. B. Gardner, and M. R. Gardner, *Deep South* (1941), pp. 147-51.

education of the children, and, in the fields where useful operations on the environment are impossible or inconceivable, the performance of rituals. It is useless to go into the whole list. For a group which is not in immediate contact with the natural environment, but is a sub-group of a larger group, the operations performed are those set for it by the larger group. Thus a body of men may be casting engine-blocks in an automobile factory or handing down legal decisions in a court house. In any case, the operations the group performs in the primary system are those it carries out on whatever constitutes its particular environment.

Sentiments are represented in the primary system by the ones which men bring to a group as distinguished from the ones induced in men by the action of the group upon them. For a primitive group, or any other group in immediate contact with its natural environment, these are the sentiments of fear, hunger, thirst, and any other so-called primary drives that we wish to mention. For a working group in a factory, the sentiments in the primary system are much more complex: need for something to do, need to support a family, need for association with others. Such sentiments cannot be called primary in themselves, since they are induced in men by the action of social groups, but they are primary with respect to the group considered. If the sentiments are the ones a member brings to the group, the analysis remains the same whatever their origin.

Finally, the pattern of interaction in the primary system is the one necessary to put into effect the operations required. Here two kinds of interaction can be distinguished, which Barnard calls *lateral* and *scalar*.[15] For a factory group, lateral interaction is illustrated by the man who paints an automobile mudguard and then sends it on to another man who puts it into the final assembly, scalar interaction by the foreman who, to use the conventional phrase, coördinates the work of several men. The organization chart shows the intended pattern of scalar organization in the factory.

Mutual dependence of the elements of social behavior. In neither the primary nor the secondary system are the elements of social behavior independent. They are in a state of mutual dependence with the environment, plant and tools, ideologies, and with one another. Only the last relationship will be considered systematically here: the mutual dependence of operation, sentiment, and interaction.

The three determinants of social behavior are mutually dependent. Only by mathematics can such a situation be described adequately, and mathematics for the moment we cannot use. We do not have the indices which could turn the determinants into variables. Instead we are forced to use ordinary language, which is equipped for handling only one independent factor and one dependent factor at a time. Here, therefore, the mutual dependence of the determinants will be considered by pairs, of which there must necessarily be three: sentiment-operation, operation-interaction, and interaction-sentiment. This method seems inescapable, but its difficulties must be faced. For instance, it is easy to say that the determinants interaction and sentiment are mutually dependent, but when we go on to say just how they are, we are forced to assume something about "other things being equal." L. J. Henderson was fond of saying: "People talk about 'other things being equal' without saying at what point they are equal." In discussing the mutual dependence of interaction and sentiment in the secondary system, we may say: "Other things being equal, persons who interact with one another tend to like one another." This theorem is one of the most important and most often forgotten in sociology. We often act on the assumption that if we can only "get people together" their coöperation will be improved —other things being equal. What are these other things, and where are they equal? If, among them, we consider only the element of operation, we recognize that two persons who interact with one another tend to like one another only if neither of them behaves,

[15] C. I. Barnard, "On Planning for World Government," in *Approaches to World Peace* (1944), p. 838.

that is, performs operations, so as to irritate the other beyond a certain point. If either of them is irritating, the mere fact of bringing them together, increasing their interaction, will increase negative rather than positive sentiments. In short, interaction and sentiment are mutually dependent in a certain way on the assumption, not that the element of operation is out of the concrete phenomenon, for we know it comes in, but that this element is favorable at a particular point. The same problem reappears, of course, with the other pairs. An effort has been made to face it here as soon as it arose. In mathematics the difficulty is handled under the subject of partial differentiation.

Mutual dependence of sentiment and operation. Whether we think of the sentiments we share with the savages: fear, hunger, cold, thirst, and the like, or, in more general terms, of those a man brings to any organized group, in either case we say that sentiment gives rise to operations, or is the motive for operations, and that, the operation completed, the sentiment itself is modified. The connection seems to hold good to some degree whether the operation produces a directly useful result or, like magic, takes the place of such an operation which is unknown or impossible. The character of the connection between sentiment and operation is discussed at length in psychology. We know that it is seldom an unconditioned reflex: the farmer does not plow because he is hungry but because it is time to plow. There is no need to go further, once the place of this body of knowledge in the present scheme has been pointed out.

Mutual dependence of operation and interaction. That the members of this pair are mutually dependent is a matter of experience and a truism of the literature of organization. For any set of operations at least as complicated as two men sawing a log, an accompanying set of interactions is required, without which the successful completion of the operations is impossible. In a modern army or mass-production industry the required pattern of interaction is immensely complex, and the interaction is made possible by specialized techniques of communication. We say that the more elaborate the division of labor the more elaborate must be the process of coördination. Or, as Chapple and Coon write: "The coördination needed in any complex technique is impossible without interaction. As we have seen, most complex techniques involve the activities of more than one person, and, in fact, where people practice a number of complex techniques, extensive interactions must take place to coördinate the work of manufacturing, to secure raw materials, and to exchange the goods produced. In other words, the growth of complexity in technical processes goes hand in hand with an increase in the amount of interaction and in the complexity of the interaction pattern."[16] One more thing should be mentioned. The pattern of interaction is not uniquely determined by the operations. In certain circumstances, there may be several schemes of organization which satisfy equally well the needs of the work to be done. On the other hand, not just any scheme will do. The operations set limits to the pattern of interaction, as indeed the available pattern sets limits to the operations which can be realized. A large amount of learning which it is unnecessary to go into here exists in this field.

Mutual dependence of interaction and sentiment. As far as logic goes, this relationship holds in the primary system, in the sense that if x is a function of y, and y is a function of z, then x must be a function of z. There may even be a direct connection, if interaction with other men, for its own sake, be one of the primary drives of mankind. There is no doubt that the drive exists. Whether we should put it in the same class as hunger and thirst is another question. In any case, this relationship will be considered part of the secondary system, the line between primary and secondary being a matter of convention.

The secondary system. Before any discussion of the ways in which the three elements are represented in the secondary system, some time must be spent looking at this sys-

[16] E. Chapple and C. F. Coon, *Principles of Anthropology*, p. 250.

tem as a whole. The distinction made by Warner between the primary and the secondary, the technological and the social system has been noted. The former is thought of as the initial means of adjustment of a group to its natural environment; the latter controls and regulates the former. This paper has insisted that the idea must be generalized, that any group whatever has a primary scheme of adjustment to the environment on which it operates, be that environment "natural" or not, and that out of the primary system further social relations arise which, for good or ill, profoundly modify the initial adjustment.

The language used has been Warner's but others have made the same distinction. Some idea of a man's behavior being modified by his membership in a group is fundamental in sociology. We are all trying to bring out its full implications. For instance, Barnard writes: "When the individual has become associated with a coöperative enterprise he has accepted a position of contact with others similarly associated. From this contact there must arise interactions between these persons individually, and these interactions are social. It may be, and often is, true that these interactions are not a purpose or object either of the coöperative systems or of the individuals participating in them. They nevertheless *cannot be avoided*. Hence, though not sought, such interactions are consequences of coöperation, and constitute one set of social factors involved in coöperation. These factors operate on the individuals affected; and, in conjunction with other factors, become incorporated in their mental and emotional characters. This is an effect which makes them significant. Hence, coöperation compels changes in the motives of individuals which otherwise would not take place. So far as these changes are in a direction favorable to the coöperative system they are resources to it. So far as they are in a direction unfavorable to coöperation, they are detriments to it or limitations of it."[17]

An insight of the same sort comes from the institutional economists. C. E. Ayres writes: "A component part of every culture is a vast system of tools and tool-using activities. Economists are certainly interested in this sort of thing, and their interest is focused not on the engineering aspect of the tools as artifacts but on the pattern of the system of activities so constituted. Futhermore the interest of economists is not limited to these activities. A further component of every culture is another system of activities in which all these tools and all the products of their use are employed to very curious effect. They are employed ceremonially, and their manipulation in this fashion has the effect of establishing claims, exhibiting prestige, dividing the community in terms of 'ceremonial adequacy' along lines which are more or less coincident with those which are objects of interest to anthropologists, sociologists, political scientists, and the rest. These activities also constitute a system which is part of the total system, which is the culture."[18] Ayres, like Barnard, is making the distinction between the primary and the secondary system. He goes on: "These two activities condition each other in both directions." That is, the secondary system and the primary are mutually dependent. One criticism may be made of Ayres. His line between "tool-using" and "ceremonial" activities stems from Veblen, and from Veblen there remains a hint of disapproval of ceremonial. The secondary system is thought of as a drag on the primary: it is wasteful. Sometimes it may be so, but sometimes the social may help sustain the technological. Barnard's statement is much wiser, that the secondary system may be either a resource or a detriment to the primary. At any rate, the institutional economists have made the same kind of distinction as the sociologists and anthropologists.

Warner, Barnard, and Ayres, writing quite simply, as men must write to give a first impression of a complicated phenomenon, speak as if the secondary system could be separated from the primary. When the

[17] C. I. Barnard, *The Functions of the Executive*, p. 40. See also pp. 45, 52, 60, 120, 286.

[18] C. E. Ayres, *The Theory of Economic Progress* (1944), p. 98.

time comes to refine the theory, a difficulty will have to be faced here. The distinction between the two systems is analytical, conventional if you will, and no more. What we observe are concrete operations, sentiments, interactions. One part of each may be assigned to the primary system and one to the secondary. It would be correct to compare this method with Galileo's description of the path of a projectile in terms of two components: uniform motion in a straight line, and uniformly accelerated motion downward, but for two considerations. In the first place, the physicist who follows Galileo does in fact perform two separate operations. He measures the muzzle velocity of the projectile and the acceleration of gravity. What operations to compare with these do we have in sociology? Only when a new group has been formed to do a particular job have we a chance to watch the secondary system grow out of the primary. In the second place, the two motions the physicist considers are independent of one another. However they be defined, the primary and secondary systems are not independent. Here are the difficulties for someone concerned about the operational definition of concepts, and they are serious.[19] But science proceeds by approximations, and some crude ideas have served well while awaiting refinement. For the purpose of exposition in non-mathematical language, some distinction like that made between the primary and secondary systems seems inescapable.

After these preliminaries, a more detailed discussion of the secondary system can begin. The three determinants of behavior are represented somewhat differently here and in the primary system. Reference to an actual group will illustrate. Roethlisberger and Dickson, in their description of the Western Electric Researches, analyse at length the Bank Wiring Observation Room group.[20] In the room men were at work wiring switchboards for central telephone office equipment, and a large amount of their behavior centered around this chief activity. In the present terms, this was the primary system of the group. But another large field of behavior grew out of and elaborated upon the primary system. The group as a whole had adopted a certain standard of output and kept actual output closely pegged to it. Within the group two cliques had developed, that is to say, a pattern of interaction over and above the one required by the work. The members of each clique felt friendship for other clique members and a certain amount of antagonism, consonant with the unity of the group as a whole, for men who did not belong to their clique. Finally each clique followed its own style of operations. In the games its members played, the food they ate, their topics of conversation, each clique was set apart. Even the degree of restriction of output varied slightly but significantly with clique membership. It is unnecessary to go into further details. The charm of the picture is its familiarity.

In the secondary system, then, sentiment is represented by feelings toward persons and their operations: feelings of liking and disliking for individuals, approval and disapproval of the things they do. "Valuations" might be a good word for the sentiments here, since approval and disapproval are not two things different in kind but two values on a continuous scale. Here also should be included the feelings of constraint which may exist between a person in authority and his subordinates. Operations are represented by the ones which do not directly advance the principal activity of the group but which are, as we say, social: expressions of group membership and differentiation. Finally, the pattern of interaction is more than the one required for the coördination of the operations of the primary system.

Mutual dependence of interaction and sentiment. The aim of this paper is to outline a conceptual scheme and not to elaborate the theorems which may be stated in its terms. On the other hand, there is little point in developing the scheme without showing the

[19] The author is in full agreement with the operationalists, provided that recognition be admitted as one of the operations, necessary even in reading pointers on dials. "Is that a duck?" is not a meaningless question, and the operation which answers it is recognition.

[20] Roethlisberger and Dickson, *op. cit.*, pp. 379-548.

uses to which it may be put. In fact the theorems, in the inchoate form, probably suggest the scheme, although any scheme worth its salt, once developed, will suggest further theorems. The elements of social behavior are mutually dependent in the secondary system as in the primary, and the chief theorem of the mutual dependence of interaction and sentiment has already been cited, namely that, speaking relatively, you like persons you interact with frequently and dislike persons you interact with infrequently. Thus, in the Bank Wiring Observation Room, friendships were positively associated with clique membership. The mere fact is the important thing, no matter which determinant you choose to regard as the "cause" and which as the "effect." The theorem seems to be fundamental in sociology and assumed in much of our discussion of the in-group.

The theorem, like all such theorems, does not hold good unless "other things are equal." One of these other things, already mentioned, is the element of operation. Another is authority. If one man is interacting with another and is his superior in authority, experience suggests that new sentiments are often aroused which make the emotional relationship deeply ambivalent, and for perfectly good reasons in that in fact two influences are at work: the interaction and the authority. The latter may cut down the amount of interaction which would otherwise be expected.[21]

Mutual dependence of sentiment and operation. Two kinds of mechanism are represented here, both familiar. The first is similarity and difference. You approve of behavior which is like your own and disapprove of behavior which is different. On the other hand, if you like a certain form of behavior, your own will tend to conform to it. In the Bank Wiring Room, each clique was inclined to ridicule the behavior of the other. One clique even thought that its topics of conversation were more refined. The second mechanism resembles the relationship between sentiment and operation in the primary system in that sentiment is the motive for operations. If you feel liking or disliking for a man you tend to express the sentiment in operations. In primitive societies these operations become elaborate, in gift exchanges which may practically take over the distribution of goods, but they are important also in our own society.

Mutual dependence of operation and interaction. You increase interaction with persons who perform the same kind of operations that you do, and decrease interaction with those who do not. Roethlisberger and Dickson point out that in the Bank Wiring Room the output of the members of one of the cliques was distinctly below the standard of the group as a whole: "But, it may be asked, did their low output determine their position in the group, or did their position in the group determine their output? The answer is that the relation worked both ways; position in the group influenced output, and output influenced position in the group. In other words, these two factors were in a relation of mutual dependence."[22] The men in question were members of an excluded clique (interaction) because their output was low (operation), but it was also true that their output was low because they were members of an excluded clique. Here the relationship has been described in terms of interaction and operation alone. In their word "position," Roethlisberger and Dickson seem to include a reference to sentiment as well. Not only was interaction with the clique low but its behavior was given a low value. One purpose of the present conceptual scheme is to break down words like "position" into the simpler elements which we actually observe.

Another example of this relationship is given by the social climber. When he wants to enter a new group, he will model his behavior on the characteristic pattern of the group. He assumes that in the measure that he adopts the pattern, the members will increase interaction with him. Furthermore, since the relationship is always one of

[21] Much of the great book of J. L. Moreno, *Who Shall Survive?* (1934), is devoted to the mutual dependence of interaction and sentiment.

[22] Roethlisberger and Dickson, *op. cit.*, p. 520.

mutual dependence, the more he is able to interact with the members, the more likely he will be to copy their behavior faithfully. To pass on to another mechanism, many of the operations men perform merely serve as occasions for social interaction. In the Bank Wiring Room, many of the operations, such as playing certain kinds of games, which were part of clique behavior patterns, led to increased interaction between the members of each clique.

There is no need to labor the point that these types of behavior are so common as to be banal. It may be that the principles of human society, though many enough, are fewer than we have been ready to admit. In many sciences the principles are less complicated than their interweaving in the concrete situation. For each case of mutual dependence among the elements of behavior, enormous complexities are introduced when, instead of considering two individuals or groups, you consider three or more. Thus it is proverbial that increased interaction and positive sentiment between two persons in the in-group implies decreased interaction with and negative sentiment toward third persons who are outsiders. A more general statement is that the relationship between two individuals or groups A and B is not something apart from the relationships between A and C, D, E . . . and those between B and C, D, E. . . .[23] Elaborate systems of relationships arise in this way. Perhaps the best known of these systems (and note that authority is always one of the factors in them) are the family organizations of primitive and civilized societies, but the same principles apply generally.[24]

Dependence of the secondary system on the primary. The primary and secondary systems have been described separately although they are not separate. Not only can the two be divided only for analysis but, even in analysis, they are not independent of one another. The secondary system arises, so to speak, out of the primary and in turn reacts upon it. Barnard's remark is worth repeating: "Coöperation compels changes in the motives of individuals which otherwise would not take place. So far as these changes are in a direction favorable to the coöperative system they are resources to it. So far as they are in a direction unfavorable to coöperation, they are detriments to it or limitations of it." As usual, the important thing is to recognize the mutual dependence of the primary and secondary systems explicitly, systematically, and in its full generality.

Here the dependence of the secondary system on the primary will be considered first, and special emphasis will be given to the element of interaction. Operations in the primary system may, within limits, demand a certain scheme of interaction. In industry a number of men may be working in the same room. Or they may be performing in a certain order different parts of a total operation on an object, so that when one man has done his part he passes the object on to the next man. Or they may have the same foreman. Whatever the reason, geography, flow of work, or supervision, they are, as we say, thrown together. What they do makes it likely or inevitable that they will interact. Furthermore, interaction left to itself increases positive sentiment, which will increase the interaction still more. This last mechanism has been arbitrarily called part of the secondary system, so that, in terms of the present conceptual scheme, the primary system gives rise to the secondary. There is another way of saying the same thing. When men interact in the primary system, it is often observed that they increase their interaction beyond the amount required by the primary system. We call this increment social, and say that any congeries of individuals, brought together in any way, tends to become something more, a social group.

Another mechanism by which the secondary system elaborates on the primary is the following. In the primary system there is usually in every group a man who acts as center of communications, that is, as leader of the group, and in complex organizations these centers are arranged in a hierarchy.

[23] Stated in E. Chapple, *Measuring Human Relations*, p. 70, but the present writer does not accept Chapple's method of describing the relationships.

[24] See R. Firth, *We, The Tikopia* (1936), chs. IV-VI, also Roethlisberger and Dickson, *op. cit.*, p. 333.

The leaders receive information and give orders, and it seems to be a matter of experience that between persons in authority and their subordinates a certain kind of sentiment often exists. It may be called constraint, but under any name the sentiment between two men in this relationship is different from the sentiment between two men who are interacting as equals. Furthermore, between such men, interaction, instead of increasing, tends to be kept near the minimum required by the primary system. This theorem is warranted by the behavior of fathers and sons in many patriarchal families and by the separation between grades in armies. It is subject to the usual limitation of "other things being equal." In particular, if the subordinate is in an insecure position and feels that his advancement depends less on his own work than on his personal relationship with his superior, bootlicking may begin and interaction increase rather than decrease.

Once again, then, the requirements of the primary system give rise to certain sentiments between men, sentiments which have been called part of the secondary system. In this particular case, the sentiments tend to discourage rather than encourage social interaction. The increase of interaction between so-called equals and its relative decrease between superiors and subordinates are the first steps toward the formation of classes in organizations and in society at large.

Dependence of the primary system on the secondary. Barnard argues that once the secondary system is established its influence on the primary may be favorable or unfavorable, and Roethlisberger and Dickson make the same point: "It is well to recognize that informal organizations are not 'bad,' as they are sometimes assumed to be. Informal social organization exists in every plant, and can be said to be a necessary prerequisite for effective collaboration. Much collaboration exists at an informal level, and it sometimes facilitates the functioning of the formal organization. On the other hand, sometimes the informal organization develops in opposition to the formal organization."[25] An example of the latter is the restriction of output adopted through informal organization.

Another example has been made famous by Veblen and referred to in the passage from Ayres cited above. Two parts may be distinguished in any economic activity such as building a house. The form of the house is in part determined by "needs" for such things as warmth and shelter. It is in part, we usually say in its style, determined by other factors, by the social class to which its occupants belong and by more general community custom. Veblen spoke of the effect of these latter factors as "conspicuous expenditure:" they brought about a destruction of wealth. In the present terms, the effect of the secondary system is in some way unfavorable to the primary. Conspicuous expenditure is particularly conspicuous at times when the classes are fluid, that is, when people feel a need to make their social position highly visible.

What Veblen and his followers forgot is that if y is a continuous function of x, there is probably a region within which the value of the function is positive not negative. The suggestion has been made that well established social standards of living, which require that families purchase certain goods as a mark of group membership, may help prevent the collapse of the economic system in times of crisis, by sustaining demand.[26] At any rate, the main lesson of the industrial research of the last two decades is that effective coöperation is never a matter of the primary system alone, and that developments in the secondary system may either sustain coöperation or break it down.

Finally, the secondary system of a social group may give rise to the primary system of another social group. This happens when the standard of operations in the secondary system becomes a positive program which is to be put into effect and thus requires organization. For example, antagonisms in an industrial plant may lead to the formation of a union. But a union is an organized activity which will have its own primary and second-

[25] Roethlisberger and Dickson, *op. cit.*, p. 559.

[26] E. Mayo, "La Stabilité Économique et le 'Standard of Living'" in *Le Travail Humain*, Vol. I (1933), pp. 49-56.

ary systems. In fact the leaders of the union may have the same kind of trouble with their followers that the managers of the factory had originally. The systems are always to be discerned with relation to the particular group in question.

The condition of equilibrium. The elements of social behavior have been described as mutually dependent in two systems, which are themselves mutually dependent in the total social system. Experience in the developed sciences, and, as will be shown, even in our own, suggests that the relationship between the elements is not determinate without some criterion of equilibrium. As Henderson puts it: "Another characteristic of many ideal systems that is, in general, indispensable in order that conditions shall be determinate is the establishment and use of some definition of equilibrium, whether in the case of statical equilibrium or in the case of dynamical equilibrium. For the abstract conceptual scheme this is as a rule the decisive feature that goes farthest to establish determinate conditions."[27] In a developed science, a general equation of equilibrium will appear which takes its place as one of the equations, equal in number to the number of variables, which describe determinate conditions.[28]

Henderson is writing about an ideal system such as the social system of this paper presumes to be. This kind of system can hardly be set up unless it is provisionally treated as isolated, in the sense that exchanges with whatever constitutes its environment have the value 0 or some other known value. The criterion of equilibrium applies particularly to such a system. Now nothing is in fact isolated from the rest of the universe, nor are all the exchanges between a system and the rest of the universe known. Nevertheless Newton and Gibbs showed that some systems can without serious difficulty be treated as isolated, even when the influences of the environment are great. As Henderson goes on to say: "With the help of estimates of disturbances introduced from without and of other disturbances that result from actions in the opposite direction, even when such disturbances are very complex, much can often be accomplished when the characteristics of the ideal isolated system are known."[29]

All this is general, a matter of the experience of the older sciences in stating their findings. What is its application to sociology? The crucial question is how far any social system, or, more simply, any group can be treated as isolated without irreparable violence being done to the facts. In the present ideal system, the effects of the environment and of plant and tools are regarded as given in any particular instance. As for concrete systems, primitive tribes, independent national states, and business enterprises in competition with other enterprises may come closest to realizing the conditions for being described as isolated systems. Exchanges with the environment are most nearly determinate. The difficulties are great, yet it is likely that we must, whether or not social systems shall be treated as isolated, adopt some definition of equilibrium. In fact we have done so already. In or out of business, we cannot escape the idea of the "going concern."

An example follows. The emotional constraint between superiors and subordinates is often one of the forces in a social system. Its importance is particularly clear in societies where the family is the unit which performs the essential operations on the environment. Here the father, or, in matrilineal groups, the mother's brother is the supreme authority and the sentiments existing between him and his subordinates, the other family members, help determine many of the other emotional relationships in the family. Similar observations could be made of other kinds of social groups. Now the thing to remember here is that the sentiment between superior and subordinate does not depend on the mere fact that the superior gives orders. Just giving orders has quite different effects. It depends on the giving of orders which will be obeyed—a truism whose implications we neglect at our peril. For the

[27] L. J. Henderson, *Pareto's General Sociology* (1935), p. 85.

[28] For illustrations, see E. Mach, *The Science of Mechanics*, pp. 72–5.

[29] L. J. Henderson, *op. cit.*, p. 83.

willingness of the members of an organization to obey orders, to accept authority, depends in a complicated way on the working of the organization as a whole. The operations in the primary system must provide a surplus of means of inducing the members to coöperate, and the secondary system must not generate too much antagonism to destroy coöperation in the primary. Of families as of other groups we may say that the organization can maintain itself only if its orders are obeyed, or, alternatively, that only if it maintains itself will its orders be obeyed. In either case, whether we like it or not, we are using a criterion of equilibrium and assuming, like the other sciences, that a particular condition, here an emotional relationship, is determinate only when equilibrium exists. There must be a large number of other conditions in social systems which are determinate only if the systems are going concerns. The greatness of Barnard's book, *The Functions of the Executive*, lies in the fact that, almost alone among sociological treatises, it insists, and keeps insisting, that in the case of equilibrium the amount by which any factor in social organization can be altered without altering all the other factors is strictly limited. The most important things about social groups, the conditions of their life and death, are the ones we study least.

In *An American Dilemma* Mydral argues that the idea of equilibrium is conservative.[30] Of course some simple-minded notion of statical equilibrium could be used to justify the existing order. The best corrective is not to abandon the idea, which we use whether we like it or not, but to become familiar with its actual employment in the sciences. The fundamental equation of mechanics asserts that for equilibrium the variation of the work done in the system is O. Alternatively, if the system is to pass from an initial configuration to a different final configuration, work will have to be done on the system. In ordinary language, this statement does not claim that change is impossible; it only defines the condition, namely the accomplishment of work, under which change is possible. If the work is done, Myrdal's principle of cumulation may come into play, depending on the conditions and constraints of the system, and the system pass rather rapidly to a new configuration. But these matters of logic have nothing to do with conservative or radical political opinions.

Rate of change may be more significant than change itself. Any conceptual scheme in sociology must be equipped to deal with dynamics, with change in the social system in respect to time.[31] In the broadest sense, the scheme must be historical. If the present one has been described for the statical case, a method which always makes exposition easier, it is not meant to be limited to that. It asks: If one of the elements, or one of the systems, is changing in a certain way, at a certain rate, what kinds of changes may be expected in the others? The idea of equilibrium suggests that it is more illuminating to study even a stable situation in terms of change than change in terms of a stable situation. Social scientists used to talk about the "tyranny of custom." Nothing is more defenseless than a custom, alone. Not single customs but systems of custom survive. For instance, gift exchange in primitive and modern societies have been cited as evidence that we show our sentiments in operations. But any recollection of Christmas proves that we do not give presents to people just because we like them. We also think of what might happen if we did not give the presents. They have ramifications. For the normal situation, both the specific force and the complex of forces are present at the same time. This should be obvious, but apparently is not so to everybody.[32] We can best account for the survival of any system by noticing what happens when a change is introduced in one of the components. At Christmas, at least, our ordinary social thinking follows the method of science.

[30] G. Myrdal, with the assistance of R. Sterner and A. Rose, *An American Dilemma* (1944), Vol. 2, p. 1055. See also Appendix 3.

[31] See C. Arensberg, "Industry and the Community," in *The American Journal of Sociology*, Vol. 48 (July, 1942), reprinted in S. D. Hoslett, ed., *Human Factors in Management* (1946).

[32] For an example, see G. C. Homans, "Anxiety and Ritual" in *American Anthropologist*, Vol. 23 (1941), pp. 164-72.