THE THEORY OF THE
SOCIAL FORCES

by

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22

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- I THE PROBLEM STATED.
- II THE ORGANISM AND ENVIRONMENT.
- III HEREDITY AND VARIATION.
- IV CENTRALLY INITIATED PROCESSES.
- V APPLICATION AND CONCLUSION.

Errata. On p. 43, which is omitted. P. 44 follows
immediately after p. 42.

CHAPTER I

THE PROBLEM STATED

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Professor Ross has well said that "the corner stone of sociology must be a sound doctrine of the social forces."⁽¹⁾

While this is true sociologists seem to be at loggerheads when it comes to making a statement of "the social forces". In purely scientific terms, "force", in the sense of the sufficient cause of phenomena, physical or social, may be a misnomer; but, if by "social forces" we mean "the active factors in association", the expression may be allowed to stand for⁽²⁾

want of a better term. Indeed, the term "force" is commonly applied and used in the physical sciences, and has been taken over by the social sciences as well. Since this is true, we will use the term "social forces" as equivalent to "the active factors in association", in our attempt to state what is basic in a scientific discussion of social life and institutions.

At the present time sociology is in a very unsettled

(1). E. A. Ross: *Foundations of Sociology*, Macmillan, N. Y., 1915, p. 181.

(2). Cf. H. G. Kenagy, "The Theory of the Social Forces", in *The Psy. Review*, Vol. XXIV, p. 376.

condition because there is little or no agreement as to what constitutes the social forces. But when we look back over the history of social philosophy we find that there never has been uniformity in the statement of social forces. Although he was not the first social philosopher by at least twenty-three hundred years, August Comte was the first one to clearly set forth sociology as a science and to define its scope and (1) limitations. While he made mistakes as any pioneer in science is bound to do, Comte did show that fundamental human institutions are largely determined by man's instincts and reason. His psychological bases, however, suffered from the limitations of his age. For instance, he ignored and belittled logic, thinking that the mathematical recording of observed phenomena could tell the whole story, when in reality, psychical phenomena ^{are} ~~is~~ of such a complex nature that ~~it~~ ^{they} cannot be accurately measured in the same way as physical phenomena.

Since Comte many sociologists have stressed now this and now that as "the social force" to the exclusion of other forces that may enter into the complex of social activity and social behavior. Many more or less unilateral theories have thus made their appearance; and

(1). See Comte: Positive Philosophy, Book I, Ch. 1-2; and Book VI; also Positive Polity, Vol. I, Ch. 1-2.

because of this lack of agreement among its advocates, thinkers in the physical sciences have been inclined to insist that sociology is not a true science at all. Sociology differs from the physical sciences in that it treats of the social life as a whole. As Professor Ellwood says, it is "the science which deals with the origin, development, structure and function of the reciprocal (1) relations of individuals." It deals with the evolution and organization of our social life. Thus it is a science distinct from the physical sciences, although it may freely borrow from them at times. As a science it must have a solid foundation; and its corner stone, as has been said, must be "a sound doctrine of the social forces" which make up the "reciprocal relations of individuals".

In view of the fact that there is lack of unison in regard to the statement of these social forces, a theoretical discussion of the social forces seems to be pertinent, and needs no apology. It will be the task of this paper to examine some of the various theories that have been proposed as "the theory" of the social forces; and to attempt, if possible, to set forth a sound and adequate theory of the social forces.

This lack of uniformity among sociologists has led to many conflicts over metaphysical views when science

(1). C. A. Ellwood: An Introduction to Social Psychology, D. Appleton and Company, N. Y., 1917, p. 2.

really has no need of metaphysics at all, especially in the statement and working out of its formulae and theorems. Chief among these metaphysical conflicts has been that of subjectivity versus objectivity. Some of the subjectivists in sociology, as we shall see, have attempted to reduce sociology to "feeling and "emotion". It must be granted that the use of subjective terms has at times been unwisely made in the past; yet this does not justify a negation of subjective terminology altogether. In late years a school of "objectivists", in both sociology and psychology, has made its appearance, which claims that the old criteria of objectivity are not adequate. As Professor Ellwood has stated: "The adherents of this school assert that a fact for scientific purposes is not 'anything in experience', but 'something that can be observed', a happening in the external world, which can and should be described without reference to individual psychic processes. These are the external behaviorists in psychology, and those sociologists who would describe everything in the social life in terms of habit (folkway or custom) and environment. They find no place in social science (except perhaps provisionally) for such terms as feeling, idea, belief, value, standard, mental attitude, mental interaction, and the like."⁽¹⁾ The more radical among them would rule out all reference to individual

(1). C. A. Ellwood: Objectivism in Sociology, in Amer. Jour. of Socio., Vol. XXII, No. 3, P. 289-290.

psychic process as unscientific; while others would tolerate them as helpful in scientific description, but as having inferior scientific value, and not to be used in describing behavior. This latter class predominates. The radical wing of this school numbers very few thorough-going objectivists. These would, however, reduce sociology to a sort of collective physiology; that is, they would substitute in the description of social processes the hypothetical activities of the cells of the central nervous system, which are as yet little understood, for (1) ways of thinking and feeling which we do understand. In other words, in their rigid psycho-physical parallelism they would reduce the description of human behavior to terms which would possibly be sufficient in describing the behavior of one of the lower organisms. The main objection to be raised against this school is that they fail to take cognizance of the fact that the behavior of man is much more complex than that of the lower organisms, because of the part which mind plays in determining the behavior of man. The less radical objectivists would make use of subjective terminology when it suits their convenience, although they regard it as unscientific. In other words, it seems that they are at a loss when it comes to explaining all social phenomena in objective terms, and would make use of subjective terms when the latter are

(1). See Ellwood, *ibid*, pp. 291-292.

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 more convenient. While an objective treatment is desirable in sociology in so far as it is possible; yet our ignorance of the neural correlates of such subjective facts as "desire", "opinion", "value", "standards", "ideas", etc., makes it impossible to speak altogether in objective terms. As much objectivity as it is possible to obtain is desirable in sociology, but an objectivity that rules out all subjective reference is both undesirable and inexpedient. On the other hand, a thorough-going subjectivity is also undesirable, for when conscious processes are spoken of their neural correlates must always be included.

The objectivists, for the most part, hold a passive view of human nature. They hold that the individual is by nature inert and does not act until some external cause or stimulus compels him to act. It is the sense impressions through stimuli from the environment which cause him to act. Thus the complex behavior of the individual is to be interpreted by "the law of association of ideas and sensations".⁽²⁾ The nervous system is regarded as merely a system of conductors. The stimuli from the environment act upon the receptor-organs or conductors, and initiate there a series of organic process-

(1). See Ellwood, *ibid*, p. 292-293.

(2). See Ellwood: *An Introduction to Social Psychology*, p. 52.

es. Behavior must, therefore, always be explained by the action of these external stimuli, or the way in which these stimuli associate with other stimuli already received by the nervous system. The individual thus becomes the slave of his environment. This passive view of the objectivists cannot stand in the light of the development of modern physical science. Biology, especially, has shown that spontaneity or self-activity is characteristic of living organisms.⁽¹⁾ The subjectivists, on the other hand, hold to a more active view of human nature. They believe that the mind is the chief instrument of association, and that its main function has been to adapt the individual to the life of the group through what Professor Ellwood calls "communication, suggestion, imitation, sympathy - in brief, mental interaction."⁽²⁾ The subjectivists hold further that while the stimuli from without may function in causing action, the mind also functions in the selection of what stimuli among several

(1). L. T. Hobhouse says: "The revolution in biological theory will be found, as time goes on, to have invested the constitution of the living organism, as against the environing conditions, with a new importance; and in this constitution the fundamental fact everywhere is that the living being is not passive, but active, not mechanical in its reaction to things, but assertive, plastic, and, in a measure proportioned to its development, self-determining." (Mind in Evolution, Revised Edition). See also, J. A. Thomson: Heredity, p. 172.

(2). Ellwood, op. cit., p. 57.

shall be acted upon. Civilized man lives in an ideational rather than a perceptual world. Furthermore, the socio-psychic process, which we may call "the social mind", has been gradually evolving ever since human culture began, and any attempt to try to interpret that social life in purely objective terms would be practically impossible.⁽¹⁾ To quote Professor Ellwood again, "a purely objective statement of social processes would in practice lead to a denial of the importance, in the social life, of centrally initiated psycho-neural processes in the individual. The existence of such centrally initiated processes seems beyond question in psychology. To describe them in purely physical or physiological terms would be of no advantage to the social sciences, since the names for their psychic correlates are much better known and understood. In practice, objectivism in the social sciences would mean simply some form of physical environment determinism."⁽²⁾

Another conflict that has to some extent agitated sociological ranks is that of monism versus pluralism in connection with the social forces. Like instincts, social forces have been added to and subtracted from almost at will. Professor Hayes has even gone so far as to deny that there is a concept of force at all, although

(1). See Hugo Munsterberg: *Psychology: General and Applied*, pp. 265-269.

(2). C. A. Ellwood: *An Introduction To Social Psychology*, (Preface), pp. 6-7.

he admits that there is a general metaphysical concept of power.⁽¹⁾

In occupying this position, Professor Hayes is a monist, and has carried the discussion over into metaphysics. In a recent article, Professor Dewey has well said, "henceforth, it is, pure wilfulness if anyone pretending to a scientific treatment starts from any other than a pluralistic basis."⁽²⁾ In other words, social forces are many and not one; they are plural and not singular. We cannot reduce the social forces to any one particular force; neither can we stress some one particular force to the exclusion of other forces without being false to true scientific procedure. To get at an adequate theory of the social forces a synthetic view of the many social forces which go to make up the reciprocal relations of individuals is necessary.

A third conflict which has prevailed in sociological thought has been that between a metaphysical and a scientific procedure. In the main the social sciences, more especially those of a theoretical nature, have been, and still remain today, in the realm of opinion rather than in the realm of accurate and verified scientific truth. They have been developed in the service of pet theories, social, metaphysical, methodological and political. In other words, sociology among other

(1). E. C. Hayes: "The Social Forces Error", Amer. Jour. of Socio., Vol. XVI, pp. 613-614.

(2). John Dewey: "The Need of Social Psychology", Psychol. Review, 1917, Vol. XXIV, p. 269.

social sciences, has suffered much from metaphysical speculations and methodological fads. This tendency has been one of the most serious impediments to the development of social science. (1) This is contradictory to a true scientific method, for science is not at all concerned with metaphysics. Indeed science must begin with a passion for facts, is characterized by clearness of vision, cautiousness of statement, and by a sense of the inter-relatedness of things. (2) The work of metaphysics begins only where that of the experimental sciences leaves off. It makes no careful and accurate search for facts, checking them up by experiment and observation. It has a place only in questioning the hypotheses of the experimental sciences, and their conclusions and formulae. In other words, science is not concerned with metaphysics at all, and is in no sense dependent upon it. Thus a sound and adequate scientific method is imperative for the social sciences, and for sociology in particular. Science is not built upon any universal, a priori hypothesis. The spirit and method of science is matter-of-fact, inductive (3) and pragmatic, and not deductive and dogmatic. Therefore, any adequate social theory must be inductive and practical. It must preserve the point of view, and utilize the results

(1). C. A. Ellwood: "The Present Condition of the Social Sciences", *Science*, Vol. XLVI, No. 1194, p. 470.

(2). J. A. Thomson: *An Introduction to Science*, p. 34.

(3). *Ibid*, pp. 30-38.

of the natural sciences, and build upon them as its basis. As Professor Ellwood says, "if there is any hope of the social sciences getting beyond the stage of mere socially approved opinions, and of coming to substantial agreement on fundamental issues, it must be through basing themselves upon the established results of antecedent sciences, particularly of biology and psychology." (1)

Sociology, in particular, must be largely based upon the scientific results of biology and psychology, and not at all upon metaphysical speculations. It must use the statistical, the historical, and the survey methods of research, and present facts, not theories, for the guidance of the social thinker and the social worker. Thus the conflict between the metaphysical and the scientific method of procedure must end in the total negation of the former to the entire supremacy of the latter.

Let us now examine some of the various unilateral sociological theories that have been proposed and advocated. We will first examine the theories of a few thinkers in the so-called "psychical" school.

One of the pioneer sociologists in this country was Lester Ward, who was one of the first to attempt to define the social forces. He proposed a psychical theory, contending that "the forces producing social phenomena are the social forces, and, taken together they constitute

(1). C. A. Ellwood, op. cit., p. 472.

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 the dynamic agent", which he reduced entirely to feeling.
 He says, to give a few citations from his works, "the
 dynamic agent consists wholly of feeling;" (2)
 "Feeling is a
 true cosmic force and constitutes the propelling
 agent in man and animals." (3)
 "In the associated state
 of men, it (feeling) is the true social force." (4)
 "The
 thinking faculty is not a force; but feeling is a true
 force and its various manifestations constitute the
 social forces." (5)
 Ward was entirely too subjective
 and utterly failed to recognize such objective factors
 as environment, geographic and economic, as well as the
 biological factors of heredity and variation. Furthermore,
 Ward was a hedonist and held the view that assigns to
 feeling the function of a primary force, which lies back
 of instinctive activity. He regarded all action,
 whether individual or social, as explainable on a basis
 of pleasure and pain. His psychical theory of the
 social forces is to be summarily dismissed as one-sided
 and inaccurate.

Ratzenhofer made a similar mistake, only he substituted the term "interest" for force. He thought that there were five sorts of interest which govern the social life of mankind: (1) The race interest, i.e., the impulses which center in the reproductive functions; (2) the

(1). Ward: Pure Sociology, p. 256.

(2). Ibid, p. 256.

(3). Ibid, p. 39.

(4). Ibid, p. 101.

(5). Ward: Psychic Factors in Civilization, pp. 53-54.

physiological interest, i.e., hunger and thirst; (3) the egotic interest, i.e., the entire circle of self-regarding motives; (4) the social interest; and (5) the transcendental interest, which creates religion and philosophy. (1)

Professor Small classifies human cravings as desires for health, wealth, sociability, knowledge, beauty and rightness. (2) This is nothing more or less than a simplification of Ratzenhofer. This is all right so far as it goes, but it surely is not adequate as a classification of the social forces. The social forces cannot be limited or reduced to "interests" or "desires"; and such classifications as those above made deserve the criticism which has so fully been bestowed upon them.

Professor Baldwin limits his definition to "only those psychical products, called desires, which influence individuals in their social relations". (3) Such a definition is, of course, faulty like the ones already noticed for similar reasons. In the classification given by Professor Ross we have a slight advance, and it seems to be a sort of combination of the views of Ward, Ratzenhofer, Small and Baldwin. Professor Ross regards desire as the primal force. He divides desires into (1) Natural; (4) and (2) Cultural. He makes room for practically all of the psychical factors, such as the impulses, instincts,

(1). Ratzenhofer: Sociologische Erkenntniss, pp. 54-66.

(2). Small: General Sociology, Ch. XIV and XXXI.

(3). Baldwin: Social and Ethical Interpretations, p. 484.

(4). Ross: Foundations of Sociology, pp. 189 ff.

emotions, intellectual elements, etc. Ross thinks that there are certain values which accompany the satisfaction of a number of wants. These he regards as wealth, government, religion and knowledge; and they in turn give off impulses which mingle and form the economic, political, religious and intellectual interests which, he regards as the chief forces that make up the content of history. He does not consider that these are in themselves social forces, but that they flow out of these others enumerated above. In a word, Ross regards that the psychical are the only factors to be regarded as social forces, and thus he follows Ward in his unilateral error. In closing his discussion of the social forces, Ross says, that "the corner stone of sociology must be a sound doctrine of the social forces"⁽¹⁾. To this we heartily agree, but surely Ross has not given us a sound doctrine.

The theory of the biological school is that blood, race and heredity account for all differences found among mankind. In other words, it is the "stock-breeder's" theory of society. This view has been championed by such writers as H. S. Chamberlain and Madison Grant; but its most radical advocate was Count Arthur de Gobineau.⁽²⁾⁽³⁾⁽⁴⁾ His fundamental thesis was that there is no other force in the history of man than the "chemistry of races". He

(1). Ross, *ibid*, p. 181.

(2). Foundations of the Nineteenth Century.

(3). The Passing of ~~The~~ Great Race.

(4). An Essay upon the Inequality of the Human Races.

makes practically everything connected with mankind depend upon racial purity. So long as a race is pure, he thinks, it will have like-mindedness; but deterioration follows when intermixture takes place. De Gobineau goes on to state that law, government and morality have no influence upon civilization. He says that neither physical environment, moral austerity or laxity, good or bad government, religion, piety, or godliness has any significance for the history of a people, but only the purity or mixture of its blood can count. Such a view is, of course, extreme and simply discredits itself. Race is unquestionably a factor as a social force, but is only one of many factors. All human culture is an acquired trait and is capable of being taken up by all races and assimilated by all races.

The theory and argument of the eugenicists, of course, stresses heredity as the most important factor in social life. When this is not carried to extremes, as it is in any "stock-breeder's" theory of society, it is to be given due consideration. It is, however, not to be regarded as the social force, but as only one of the many social forces. Other biological forces are variation and selection, which with heredity help to give the organism what it has to start with; but they are not to be thought of as the sole factors in association.

The environmental school, like the psychical school,

has been large, and has mainly stressed the geographic and economic environment to the exclusion, or practically to the exclusion, of the biological and psychical factors. One of the most one-sided of the geographical determinists was Thomas Buckle, who held that climate, soil, food, and what he termed "the external aspect of Nature", are the primary and ultimate causes of human progress. (1) This view of Buckle's will be more fully discussed in another place, so it will be sufficient here to say that it, like most of the preceding theories, is to be rejected because of its glaring fault of one-sidedness.

Karl Marx, who may be taken as an example of the economic determinists, held that economic considerations dominate the entire life of mankind. To state it in his own words, "the sum total of these relations of production constitutes the economic structure of society - the real foundation, on which rise legal and political superstructures, and to which correspond definite forms of social consciousness. The mode of production in material life determines the general character of the social politics and spiritual process of life. It is not the consciousness of men that determines their existence; but, on the contrary, their social existence determines their consciousness. At a certain stage of their development the material forces of production in society come in conflict with the existing relations of produc-

(1). Buckle: History of Civilization in England.

tion, or with the property relation within which they have been at work before. From forms of development of the forces of production these relations turn into their
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 fetters."

Again, such a crassly materialistic view of society merely serves to discount itself. The economic factors are to be regarded as important, to be sure, but like the geographic factors are only one of a set of factors that go to make up the complex whole of the social forces.

A new school of sociologists has arisen which aims at the same objectivity in the social sciences as exists in the natural sciences. These are known as the "objectivists". They hold, for the most part, that a fact is not a fact unless it is something that can be observed, that is, it is nothing in experience. The more extreme among them would rule out all reference to individual psychic processes in scientific description. Thus they find no place in social science for such subjective terms as "feeling", "idea", "belief", "values", and the like.

The radical objectivists in sociology have been few in number. One of the first to become prominent in sociology was Emile Durkheim, but he was only half-hearted in his rejection of psychology. As an objectivist, he defines a fact as whatever impresses itself upon observation, and not as something in experience. He regards

(1). Marx: Critique of Political Economy, (Preface p. 5).

that if sociology is to become truly scientific social facts must be treated as something apart from consciousness. (1) In fact, sociology has no concern for individual consciousness at all, for the individual is determined by the "social milieu" in which he exists. Hence sociology should not be based upon psychology at all. (2) The explanation of social phenomena, according to Durkheim, must be sought in the aggregate of its mass, and not in the characteristics of its component units. A social fact is determined by a previous social fact, but not in any individual state of consciousness. (3) Thus Durkheim holds to the hypothesis of a social mind, which is to be regarded as the origin of all social processes of importance. Instead of going on to construct a sociology in terms of the behavior complexes of the aggregate and its environment, he takes into account such collective representations as public opinion, popular belief, social tradition, popular will, and the like. For Durkheim these are social facts, although something entirely different from biological and psychological facts, for they are facts exterior to the individual. This objectivism is worse than the subjectivism which he attempts to avoid. It is really a metaphysical conception, for there can be no social facts apart from, and as distinct from, the biological and psychological. Thus Durkheim is not at all thorough-

(1). Emile Durkheim: *Les regles de la methode sociologique*.

(2). Ibid., Ch. V.

(Ch. II)

(3). Ibid, p. 135.

going in his objectivism and ends in a metaphysical subjectivism far worse than that which he starts out to refute.

A more thorough-going objectivism is found in the view of Dr. G. P. Zeliony, a docent in physiology in the University of Petrograd. ⁽¹⁾ Zeliony attempts to apply the natural science method to sociology. The analysis of observed phenomena will give us material that can be used for further investigation. Sociology, according to Zeliony, must as in natural science, first, undertake the description of phenomena and the discovery of new phenomena; and second, it must deduce the relations of law between them. Zeliony thinks that the psychic side must be left untouched if a clear, scientific conception of social phenomena is to be obtained. Consciousness has no place in a scientific description of phenomena, for we cannot know the content of other minds than our own. In the explanation of a phenomena the causal connection with other phenomena must be established; and since psychic states are not available for observation, their connection with the physical effect upon the organism offers no real explanation. Zeliony insists that we must get rid of the conception that man is a psycho-physical organism, and that he must be regarded as an organism

(1). The summary of Zeliony's views is taken from a paper by C. A. Ellwood, Amer. J. of Socio., XXII, No. 3, pp. 293-303. Zeliony's original paper may be found in the Archiv fur Rassen und Gesellschafts-Biologie, IX, 405-430.

pure and simple without reference to mind at all.

Zeliony declares that the true sociologist does not know the conception denoted by the words "marriage", "crime", "family", etc. Assassination is for him merely the killing of one person by another under certain objective circumstances. A man raises his hand to strike another; but the only possible scientific explanation of this phenomenon is one that establishes the connection between the raising of the hand and the physical and physiological antecedents. What goes on in consciousness in connection with that action does not concern the scientist, for the conception of consciousness cannot have a place ~~as~~ ⁱⁿ a scientific designation of a natural phenomenon. The scientist has no right to explain human phenomena by, or take refuge in, the mind.

Zeliony's dogmatic objectivism is to be seriously reacted against. It implies the denial of any cause outside of existing material causes. Although the mechanistic conception of life is merely a working hypothesis workable within certain limits and available only for the solution of certain problems; yet here in Zeliony we find it woven into a dogma of universal application. This ultra-scientific doctrine cannot be accepted by the sociologists for, as Professor Ellwood says, "civilized man lives in an ideational world. For him the world of real objects is largely replaced by a world of ideas,

standards, values..... Human history thus presents itself as a growing tradition, or "social mind" which cannot be understood apart from its content." (1)

Zeliony holds that there are two kinds of complicated relations existing between the animal organism and the environment. There is, first, the interaction of the organism and the environment which follows from reflection, through the intervention of the nervous system as the result of the outer world acting on the sense organs. Secondly, there is the non-reflective influence which is not entirely dependent upon the nervous system. A reflex action of an organism is due to an exchange of excitation of an ingoing nerve with an outgoing nerve through the nervous system of the organism. All of these together constitute "behavior". It may be true, Zeliony thinks, that these reactions really have their cause in psychic processes, but for the scientist the cause lies in the mechanical processes of the nervous system, i.e., the reflexes. Thus Zeliony would reduce sociology to the physiological behavior of organisms without regard for the psychic processes at all. It must be objected here that our knowledge of the nervous system and its activity is so absolutely insufficient that we cannot substitute in our description of social processes the hypothetical activities of the central nervous system which have not yet been observed for ways of

(1). Ellwood: Objectivism in Sociology, p. 302.

(1)
 thinking and feeling which we well understand. In other words, "the social mind" cannot be understood apart from its content; i.e., the ideas, values and standards which compose it.

Furthermore, when Zeliony asserts that the psychic life of others is unavailable for scientific investigation, he is inconsistent with the true state of affairs. We can know the opinions and beliefs of others as fully and accurately as we know many physical objects. We are intuitively and directly conscious of the conscious states of others, as much so as we are of the qualities of physical objects. Through the research of experimental psychology, methods have been devised whereby individual psychic processes may be subjected to some measure of scientific control, and the content of other minds may thus be known to us. Through the use of the survey method in sociology we can know the opinions, beliefs and standards of men in the mass just as fully as we can know physical objects in the mass. Because of these facts we must flatly contradict these assertions of Zeliony. Moreover, the physiological sociology which Zeliony advocates is inadequate and insufficient to explain the more complex behavior of man, whether this behavior be that of the individual, or of the group. For the present, the proper scientific procedure is to describe social phenomena partly in objective, and partly

(1). Ellwood, op. cit., p. 303.

in subjective terms; i.e., explain it in objective terms when we are sure of our ground, and in subjective terms when the phenomena is psychical, and the neural correlates are insufficiently known to give an objective description.

These one-sided sociological views that we have been discussing show us how necessary it is to obtain a synthetic view if we are to have an adequate theory of the social forces. The majority of sociologists, however, have not been fair to the set of factors which they have attempted to defend. Professor Blackmar marks an advance. He regards the social forces as the activities of the organized social body, those that arise from within and are essentially a part of its activity. He says that, "the real social forces are those that arise from the individual desires and the action of the social mass. These are the forces that are inherent in the social organism and which act in the process of social evolution."⁽¹⁾ Hence his emphasis is, of course, upon the psychical factors. But in addition to the individual desires and instincts, he recognizes the operation of the forces of nature that influence society, such as climate, the water supply, food, shelter, clothing, and the natural resources. He adds as a third set of social forces, those which arise from the mass, such as the social mind, social judgment, and conscious social control.

(1). Blackmar: Elements of Sociology, pp. 218-219.

These are also psychical factors. Blackman must be criticized because he seems to ignore the biological factors of heredity, variation, selection, etc, which are also to be regarded as social factors. Furthermore, he places entirely too much emphasis upon the desires and instincts, and ends in an entirely too subjective treatment of sociology.

Professor Ellwood has given an admirable classification of what he regards as "the original active factors in human association". He divides them into: (1) The physical factors, by which he means geographic and economic environment - the environmental factors in toto; and the biological factors of heredity, variation and selection. His emphasis, however, is on (2), the psychical factors, which he regards as the impulses, feelings and intellectual elements. (1) While Professor Ellwood places great emphasis upon the psychical factors, for the most part he is fair in his treatment of the environmental factors. He states that "over long stretches of time, the geographical factors of climate, food and soil, and the biological factors of heredity, variation and selection, seem the significant factors. At any given moment, however, the influence of these physical factors expresses itself in the social life through the impulses, feelings, and ideas of individuals; for it is only through these psychological elements (2) that any kind of social life is maintained." Thus he re-

(1). Ellwood: An Introduction to Social Psychology, p. 76

(2). Ibid, p. 76.

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gards that the physical factors furnish the raw material with which the psychical factors must work; and in large measure his view is synthetic. He violently reacts against the environmentalists and objectivists, however, and at times seems a little unfair in his treatment of these other factors, which must be given due emphasis if an adequate theory of the social forces is to be arrived at in a truly scientific way.

The task of this essay will be to attempt to present a truly synthetic view of the social forces. This to be successfully done must avoid, wherever possible, metaphysical assumptions in order that a scientific statement may be made. While at times metaphysical implications cannot be avoided, metaphysical assumptions, at least, can be avoided. In many of the theories that we have examined above metaphysical assumptions have bulked large, especially in the theories of those who would deny that sociology is in any way based upon psychology. Some of them would go so far as to say that in the tropism~~ic~~ explanation of the nervous behavior of plant and animal organisms we have all of the consciousness that it is possible to get, if, indeed, there is a concept of consciousness at all. We will endeavor, however, to follow the better sociological and psychological usage in the matter; and a careful investigation into the physical factors that function as "social forces" will unquestion-

ably show that not only do psychology and biology furnish helpful explanations of social phenomena, but that sociology is directly dependent upon them.

Furthermore, we will endeavor to follow the scientific method which has but little concern for metaphysical assumptions. Metaphysical assumptions merely serve to cloud the issue, for when the plain man speaks of conscious processes and the like, he does not think at all of their metaphysical explanations. Let us see what the scientific procedure has been in the past, and what it now is in the present. Before the evolution of science man's relations with nature were predominantly practical. Man is practical, emotional and scientific. The practical man's trend is toward doing and not toward knowing. In fact science arose out of a direct response to actual needs. Man is also emotional; i.e., he has a love for the beautiful, for the aesthetic. The scientific man has elected primarily to know. He does not directly seek, like the practical man, to realize the ideal of exploiting nature and controlling life. He seeks rather to idealize, to conceptualize the real, or at least those aspects of reality that are available in his experience.⁽¹⁾ The scientific man is certainly far from being metaphysical; he cares nothing for speculation. He is more concerned with knowing nature than of enjoying

(1). See Thomson: An Introduction to Science, ch. I.

her. He attempts to reduce the processes of nature to the simplest possible rules and formulas in order to get a working hypothesis for the world of practical experience. As Professor Karl Pearson says: "The scientific man has above all things to strive at self-elimination in his judgments, to provide an argument which is as true for each individual mind as for his own. The classification of facts, the recognition of their sequence and relative significance, is the function of science, and the habit of forming a judgment upon these facts, unbiased by personal feelings, is characteristic of what may be termed (1) the scientific frame of mind."

Thus in sociology, one, if he is to have a sound scientific method, must be willing to listen to suggestions but determined to judge for himself. An hypothesis should not be formed until after accurate and reliable facts have been ascertained and carefully worked out. Furthermore, the sociologist must have clearness of vision if he is to have an adequate knowledge of the workings of society, either of the social mind, or of the behavior of the social group. As Dr. Thomson says: "The scientific mind is especially marked by a passion for facts, by cautiousness of statement, by a clearness of vision, and by a sense of the inter-relatedness of things. It is contrasted with the emotional or artistic mood, and with the practical mood, but the three form a trinity (knowing,

(1). The Grammar of Science, p. 8.

feeling, doing), which should be unified in every normal life."⁽¹⁾

Thus science has no business whatever in starting with metaphysical distinctions, for they have no place in scientific statement or scientific method. Science states the facts and attempts to discover formulae or laws which control the observation of phenomena, and what it cannot explain it leaves untouched. The work of metaphysics begins only where the work of experimental science leaves off. Metaphysics is not concerned with careful and accurate search for facts and their verification. It only questions the hypotheses of the experimental sciences, their conclusions and formulae, not with any intention of disproving them, but rather in an attempt to get at what is or is not real existence, or reality. Metaphysics is not concerned with the acquisition of facts, but rather with their explanation and interpretation; while science is directly concerned with facts, and cares little for their interpretation. Science is not concerned with metaphysics at all, and is not in the least dependent upon it; while, on the other hand, metaphysics is absolutely dependent upon scientific fact and discovery. For example, it is the business of the scientific anthropologist to discover all that he can of prehistoric man that light may be thrown upon the problems of anthropology. He digs down through layer after layer of geological strata and unearths the remains of the Neanderthaloid type of man,

(1). Thomson: An Introduction to Science, p. 34.

together with his cultural implements and weapons. By the aid of definite formulas and laws he records the facts in the case. By using the laws of variation, heredity and isolation, he traces out the evolution of man from this primitive type of being to man as he now is. But the scientist cannot indulge in metaphysical speculation if he is to be true to science. His conclusions must be absolutely checked up by facts ascertained through analogy, induction and deduction. None of these three methods can be used alone, but all must be synthetized if a reasonably scientific conclusion is to be arrived at.

Thus we see that science, if it is to remain science, cannot start with metaphysical assumptions; yet it seems that some sociologists and psychologists resort to at least metaphysical implications. To illustrate this point, let us take the case of a man walking along
(1)
a road. He sees a broken wire, and he stops because the "idea" of danger presents itself, as the functionalist would say. The mechanist would say that the sight of the wire and the act of stopping are the neural correlates of the "idea" of danger, but that the "idea" of danger does not cause the man to stop. This latter explanation seems to have at least a metaphysical implication, since the mechanist must admit that the "idea" of danger was there whether or not the neural correlates furnished the cause. In this case, however, when the mind was

(1). A. P. Weiss: Relation Between Functional and Behavior Psychology, *Psy. Rev.*, Vol. XXIV, pp. 300 ff.

informed of the broken wire, and the "idea" of danger was formed, it (the mind) actually functioned in causing or determining behavior. While the functionalist would state that the function of perception is to control action; i.e., the mental process determines behavior; on the other hand, the behaviorist holds that it is the neural correlate that controls behavior, i.e., the stimuli from the outside environment determine what the behavior is to be. If this is not metaphysical reasoning, what in the world is it?

When the plain man speaks of conscious processes, such as thought or feeling, he never dreams of separating them from the brain processes that are involved. To speak of "the neural correlates" of consciousness, or of behavior, means nothing to him. In fact no one makes such distinctions save the psychologist who does it in a methodological way, or the metaphysician who does it to meet and to solve his problems. Then why should not the sociologist be permitted to make use of subjective terminology, such as "ideas", "beliefs", "standards" and "values", since he does not know their physiological or objective equivalents or correlates?

With this statement of the problem, and a determination to avoid metaphysical assumptions which render the use of a scientific method difficult, if not impossible, let us proceed with our inquiry into the statement and theory of the social forces.

CHAPTER II

THE ORGANISM AND ENVIRONMENT

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The influence of the environmental factors in sociology is important. The environment plays a great part, although not the whole part, as we shall endeavor to show. By the environmental factors is meant the total influence of the environment, both economic and geographic. Heredity furnishes the organism what it has to start with; the psychical factors furnish it with the means of developing and expanding its life; while the environment furnishes the raw material with which it must work. This does not necessarily mean that the organism must be the slave of its environment, but rather that the environment largely molds and determines what the plastic nature of the individual shall develop into. To some degree, the life of the lower organisms exclusive of man is almost wholly determined by their environment; while man is not. Our inquiry will be extended largely in the direction of the place that the environmental factors have in the determination of man's development, especially in its more social aspects.

The geographical environment, by which is meant the action of such forces as food, soil, climate, natural resources, topography, etc., upon the organism, has had considerable influence in the formation of human societies and human associations. This has, however, been entirely overemphasized by such one-sided writers as Buckle, who contended that climate, soil, food, and what he termed "the external aspects of nature", are the primary causes of human progress, indeed the ultimate causes. (1) He says that "the general aspect of

Nature produces its principal results by exciting the imagination and by suggesting those innumerable superstitions which are the great obstacles to advancing knowledge." (2)

Thus mountainous districts, or countries, cannot produce poets because the external aspect of nature is so great that those residing there can have no imagination. In mountainous countries natural phenomena such as earthquakes, tempests, hurricanes, pestilences, etc., are so frequent and disastrous that they affect the imagination of an ignorant and superstitious people. Hence, Buckle contends that in countries where these phenomena take place the civilization of the people is invariably inferior to what it is in countries where such phenomena are absent, or at least infrequent. Then Buckle

(1). Thomas Buckle: The History of Civilization in England.

(2). Ibid, p. 29.

comes to the sweeping generalization that such phenomena are generally absent in Europe, and present in non-European countries, and hence the conclusion follows that the fundamental division of human history to be made is between the civilization of Europe and that which is non-European. It is, he argues, because in Europe man is stronger than nature, and elsewhere nature is stronger than man. Such geographical determinism merely discredits itself. We moderns know that Asia has produced practically all of the great religions of the world, and some of the finest literature and art that the world has ever known; while in America contributions have been made to literature, science and art, which rival the production of the best minds that Europe has produced.

It will not do to dismiss the influence of the geographic factors by simply ridiculing Buckle. They do bear an important relation to the development of human society. No one can doubt the fact that where the climate has been favorable to the securing of an adequate food supply, and where the natural resources of a country have been plentiful, the people of that country have in nearly every instance greatly prospered. Let us take for example the settlement of our own country. The climate was favorable, the soil was rich and fertile, the natural resources almost unlim-

ited. When the white man landed on the shores of North America he found practically everything at his hand, and a civilization was reared equal in time to the best that the old world could afford. However, the illustration can be applied in another direction. The geographic environment was favorable for the American Indian, then why did he not develop a civilization that was worthy to rank with the best that the old world could produce? It will not do to dismiss the question by asserting that the solution of the problem is to be accounted for by a dissimilarity in race. It may be so in part, but it is equally true that there was also a dissimilarity in psychic factors. In other words, the psychical equipment of man also determines what his civilization is to be, and may in some instances determine and control his geographic environment. However, when the geographical environment is favorable the general result is that human society will develop along cultural lines far more quickly and effectively than if the environment is not favorable.

Scarcely second to the geographical environment in importance is the economic environment. The cultural origins of civilization can be easily traced to the evolution of industry and the capacity of man for tool-making and tool-using. The "instinct for

workmanship", as Dr. Veblen maintains, is as primary
 (1)
 an instinct with man as are other instincts. In
 the more favorable environments technology has made its
 most rapid advances. Where the environment has been
 favorable, e. g., the steppes of central Asia and the
 river valleys of central Europe, a pastoral industry
 was evolved, and great flocks and herds were accumulated
 by the peoples engaged therein. Along with this
 development and accumulation of wealth in the shape of
 flocks and herds there was a relative increase in popu-
 lation, and of necessity man was forced to till the
 ground. Thus an agricultural culture was evolved, or
 (2)
 rather, in most instances, a series of mixed farming.
 This of course prospered to a greater extent in the
 fertile river valleys where the environment was suitable.
 In these rich river valleys the population tended to
 increase at a more or less rapid rate, the rivers furnish-
 ed channels of transportation, and the evolution of
 industry was inevitably achieved. Thus from the geog-
 raphical and economic environment can be traced the
 technological development of industry, which has played
 so large a part in human civilization. Still further,
 many of the institutions of the race can be traced back
 to this geographical and economic environment, which of

(1). The Instinct of Workmanship, Macmillan, 1910.

(2). Veblen: Lectures on Economic Factors in Civilization.

course tended to color, to mold, and to shape the customs and traditions of the people. For instance, the patriarchal family was an inevitable outcome from the pastoral industry wherein warlike organizations must prevail for both defense and offense. With a military organization the power tended to be in the hands of the men. This led to the view that woman was of less importance than man, so descent was traced through the male line, and in time the patriarchal family was evolved. The government, too, with its hereditary king, was developed from the patriarchal chief of the pastoral group.⁽¹⁾ From these few examples it can easily be seen that the economic and geographical environment has unquestionably played a large part in the development of civilization, though not the whole part.

While admitting that the environmental forces play a large part in the shaping and molding of the customs, traditions and occupations of mankind, we would deny that they account for the entire development of civilization. Surely they do not account for all of the variations which we find existing between different peoples! Furthermore we find some peoples developing a wonderful technology and culture under extremely unfavorable environmental conditions. An illustration

(1). I am indebted to Dr. Veblen for this explanation of the evolution of the pastoral culture with its patriarchal organization.

of this is seen in the wonderful agricultural development attained by the Pueblo Indians in a semi-arid country, which far surpassed the agricultural achievements of other tribes living in a far more favorable habitat. Surely environment does not explain this. Environment surely does not explain the superiority of the Japanese to the Chinese, for the rich valleys of the Yank-Tse-Kiang and Hoang-Ho far surpass any part of Japan for fertility and productivity. A more deep-seated reason than environment must be sought.

What is the influence of the environment upon the living organism? That is the problem with which we will now concern ourselves. This problem is so far-reaching and so important in its genetic relations that we are involved with the origin of life itself. This problem has long been the concern of thinkers. The origin of living organisms upon this earth is as yet an unsolved problem. Science has long sought the solution, but as yet the endeavor has been in vain. Our science, however, is still young and perhaps sometime in the future some great scientific mind may give us the solution. Pfluger and Verworn have suggested that the cyanogen radical (CN) was the starting point of the proteid molecule which is an essential constituent of the physical basis of life. This is theory only. Another theory is the chemical enzyme theory of the ori-

gin of life. It presupposes that the world was in primitive atoms, and in this flux of molecular substance a single catalyzer appeared. Two particles united through the action of this catalyzer. Then two more combined, throwing off new catalyzers, and forming new enzymes. Thus around the core of this first product with the catalyzer at the center, the complex process of life had its simple beginning. The holders of this theory account for protoplasm by assuming a process called "catalysis", or "auto-catalyzation". Surface tension begins, but when the forces of gravity become so great as to arrest this tension, there is a breaking up and splitting into two of a substance known as "primitive protoplasm". From this simple origin, the holders of the enzyme theory argue, was developed the nucleus for the more complex forms of life, the procedure being from the simple to the complex through the action of catalyzers forming enzymes.⁽¹⁾

This is, of course, a mechanistic theory of the origin of life, as is the one first stated. While it must be recognized that the synthetic chemist can do wonders in building up complex things from simple origins, artificial life has as yet never been produced. So far nothing in the chemical laboratory has been found

(1). Professor Elliott: Lectures on Genetic Psychology, given at Yale University.

that could take the place of the directive chemist of the Universe, since there is so great a gap existing between the making of organic matter and the making of an organism.

One of the nearest approaches to a partial mechanistic mode of reproduction is that made by Professor Jacques Loeb, who performed experiments which seemed to show that the spermatozoon may be dispensed with. That is, he was able to induce parthenogenetic development artificially in cases where it does not normally occur. He began with the hypothesis that the reason why the eggs of many marine animals do not develop parthenogenetically is that something in the environment, i. e., the sea-water, prevents it. He conducted his experiments by supplying that which was lacking. To quote Professor Loeb, "the mixture of about 50 per cent of $\frac{2}{3}$ n Mg. Cl.₂ (magnesium chloride) with about 50 per cent water was able to bring about the same effect as the entrance of a spermatozoon. The unfertilized eggs of the sea-urchin *Arbacia* were left in such a solution for about two hours. When brought back into normal sea-water they began to segment and form blastulae, gastrulae, and plutei, which were normal in every respect. The only difference was that fewer eggs developed, and that their development was slower than in the case of the normal development of fertilized eggs. With each experiment

a series of control experiments was made to guard against the possible presence of spermatozoa in the sea-water.

From these experiments it follows that the unfertilized egg of the sea-urchin contains all the essential elements for the production of a perfect pluteus.....

All that the spermatozoon needs to carry into the egg for the process of fertilization are ions to supplement the lack of the one, or counteract the effects of the other class of ions in the sea-water, or both. The spermatozoon may, however, carry in addition a number of enzymes or other material. The ions and not the nucleons in the spermatozoon are essential to the process of fertilization." (1) This experimentation, however, merely proves that the spermatozoon and ovum are completely equipped potential organisms, and that partial parthenogenesis was already latent in the unfertilized eggs. Artificial means have thus far failed to cause or induce parthenogenesis in the higher organisms, and up to the present time the mechanistic attempt to explain the origin of life or to artificially reproduce life has failed.

*it might be
well to
specify what
form.*

The mechanists have a tendency to interpret the behavior of the animate in terms of the inanimate. The

(1). Jacques Loeb: "On the Artificial Production of Normal Larvae from the Unfertilized Eggs of the Sea-Urchin (Arbacia), Amer. Jour. Physiol. III, pp. 434-471.

organism, they regard, is a whole consisting of parts, each of which is conditioned in its behavior, and often in its existence by its relation to the remainder. These relations are such that as the parts interact with one another and with the outside world, they tend to undergo a regular series of changes which constitutes the development of the organism from birth to death. Since many of the processes of the living body can be explained upon mechanistic principles, that is, in particular the physical processes, they argue that a more perfect knowledge will enable us to express all organic processes in purely mechanistic terms. They offer in support of their contention that the circulatory system, for instance, in which the blood pulsates from the heart, could be inferred from the action of a pump. The systems of distribution and transportation, also, in the living organism have their physical counterpart in the similar systems in the physical world. They are inclined to maintain that future knowledge will enable us to reduce purposive action, artistic creation, philosophic thought, and the like to a complex of mechanical changes in the nervous tissue. ⁽¹⁾ But the behavior of the animate cannot be expressed in terms of the inanimate. The behavior of man, as will be seen, cannot be expressed in terms of the

(1). L. T. Hobhouse: Mind in Evolution, p. 83.

behavior of a machine. We almost always know what to expect from a stone, but among the living the unexpected often happens. The changes which take place in inanimate nature such as the constant cutting of a river through its rocky bed, or the gradual action of the sea in its shaping of the contour of the shore, are mechanically determined by the environment in a passive sort of way, and not in any active, purposive sense. The response of inanimate objects to external stimuli can be exactly determined. In the exploding of a torpedo, a mechanism releases the compressed air which is stored up in a chamber especially prepared, but the result can be exactly determined in advance. This sort of response is not found in the animate world, for the responses of living creatures are of a higher type.

The behavior of the selenium dog, which had selenium cells for eyes, comes nearer to the behavior of living organisms. An ingenious inventor made an automatic dog with wheels so that it could be moved in any direction through the action of the light upon the selenium cells. A complex clock-work was fashioned inside the dog, which in response to the light would go in any direction from which the light came. The behavior, however, was a direct reflex of the mechanism's response to some factor working external to it; there was nothing within the mechanism that made it respond.

*Insulated
circulation of
stimulus*

This may be regarded as an illustration of the more complex behavior of machines. The living organism differs from a machine in its greater efficiency and the complexity of its behavior. As Dr. Thomson says, "it is a self-stocking, self-repairing, self-preservative, self-adjusting, self-increasing, self-reproducing engine."⁽¹⁾ The machine is the tool, the production of human thought and human ingenuity. It may be that machines by elaboration and complexity may come to be more or less like organisms, but no machine profits by experience such as living organisms can and do.

The mechanistic attempt to explain living organisms in terms of the behavior of the inanimate or that of known machines is inadequate because unscientific. There are many chemical and physical operations in a living body, yet no complete physico-chemical description has yet been given of any distinctively vital activity. And if a physico-chemical description of such a simple vital process as the passage of the digested food from the alimentary canal into the blood, or the filtering of the blood by the kidney, cannot be given, then, how can mechanism give an adequate physico-chemical explanation of growth, development, or behavior? Can mechanism explain how the heritable characters of the

(1). J. A. Thomson: Evolution, Ch. II, "The Organism and the Physical Environment".

race are potentially carried within the minute germ cells? Can mechanism explain variation? Until mechanism can answer such questions we are forced to regard its explanations as inadequate.

As Dr. Haldane has pointed out, "a living organism has, in truth, but little resemblance to an ordinary machine. The individual parts of the latter are stable, within very wide limits of immediate environment, and in no way dependent on whether the machine is in action or at rest. This stability does not exist in the living organism..... It seems clear, therefore, that we cannot base our explanation of the constancy of the internal environment on the structure of the organs which regulate it, since closer examinations show that the 'structure' of these organs is itself dependent on the constancy of the internal environment. We are only reasoning in a circle when we attempt to explain the constancy of the internal environment by the specific characters of bodily structure. The fact is that both the external environment and the 'structure' of the body remain approximately constant; but of this fact no explanation has been reached." (1) Dr. Haldane further holds that it is mainly through the nervous system that the body of especially the higher organisms, is in relation with the external environment. The nervous system

(1). John Scott Haldane: *Organism and Environment*, pp. 91-92.

must, therefore, act upon the stimuli which come from the environment; and this cannot be explained on purely mechanistic grounds. Thus we are forced to regard the mechanistic conception as inadequate.

Another theory which attempts to explain life is that which is known as Vitalism. It assumes that within the living body there is constantly at work a special influence, the so-called "vital principle", which guides the blind physical and chemical reactions which would otherwise play havoc with the organism. The best known living representative of this theory is Hans Driesch, an eminent experimental embryologist. Driesch holds that although matter and energy are what current physical and chemical conceptions describe them as being, yet in the living body they are guided by a vital force or spirit, which he calls "entelechy".⁽¹⁾ Driesch discovered that if the constituent cells of an embryo in its earlier stages of development are disarranged, or separated entirely from one another, a complete embryo may still develop, even from a single cell. He argues from this and similar phenomena, that any mechanistic explanation of life is unthinkable; and, also, that the interference of a guiding influence, "entelechy", must be assumed, which directs the assembly of material so that it develops

(1). Hans Driesch: Die Organischen Regulationen. Vorbereitungen zu einer Theorie des Lebens, Engelmann, Leipsic, 1901.

in a proper way. Driesch thus clearly and effectively criticizes the mechanistic theory, which he regards as untenable, as it is not only incompatible with the facts of heredity and embryology, but also with almost every fact in biology.

The vitalistic theory, which Driesch proposes, is also to be reacted against. As Haldane says, "experience shows us that where an organism reacts in any way it is always in response to some stimulus, whether this stimulus originates from without or within. The stimulus of fertilization normally initiates the segmentation of an ovum, and from all analogy we must conclude that the differential stimuli arising from neighboring cells or other parts determine the subsequent differential behavior of each cell in the segmented ovum. On separating the cells these differential stimuli are removed, and each cell naturally starts again from the beginning. Vitalism is a theory of this kind: (run by an inside engineer, which is preposterous), it ignores the participation of the environment in the regulation, and consequently does not correspond to the observed facts, and is thus of little use as a working hypothesis in actual investigation."⁽¹⁾

The chief merit of the vitalistic theory is that it has clearly expressed facts relating to organic regulation, and has thus shown the defects of the mechanistic theory. Mechanistic theories have a tendency to lapse more or

(1). Haldane, op. cit., p. 111.

less into vitalism, for when the existence of definite and complex physical and chemical structures in the body are assumed, their development and maintenance must be accounted for in terms of vitalism, even if only in implication.

Neither mechanists nor vitalists have actually gone to the root of the problem and inquired into the validity of the assumptions regarding physical reality. This has been regarded from the standpoint of the entire organism, whereas the body is made up of cells, each of which is a centre of life. The life of the body as a whole is maintained by co-operation amongst the constituent cells. There are continual changes going on of metabolism, growth and reproduction. The constituent cells reproduce themselves and perish, and so does the whole organism itself. Death, reproduction, and other biological phenomena, show us that life is not merely the life of individual organisms, but the life of a society of organisms. As Haldane says: "It is the life of a family, and beyond that the life of a species; or if we endeavor to push the biological analysis still further, the life of the universe itself, though such a life must remain outside the limits of clear mental vision until we can connect biological with physical and chemical conceptions."⁽¹⁾ This is the "Organicist" theory, or conception, which we shall adopt as being

(1). Haldane, *ibid*, p. 114.

the most tenable position which in the light of scientific knowledge can be occupied.

This "organicist" theory has been best set forth by Dr. Haldane in his Yale Lectures upon the Silliman Foundation, on "Organism and Environment as Illustrated by the Physiology of Breathing." (1) Dr. Haldane maintains that there is an inner as well as an outer environment to which the organism responds. While there is considerable response to the outer environment, the inner environment is not less important. Dr. Haldane regards breathing as a process in which the essential factors are the conveyance of oxygen into the body, and the removal from it of carbon dioxide. This, however, contrary to the general idea, does not take place to much extent in the lungs, but in the living tissues of the body in general. Oxygen is taken up by the blood in the lungs and is thence carried into all parts of the body, the oxygen being given off by the blood to the tissues. The carbon dioxide which is formed, is carried by the blood to the lungs where it is given off to the air which is breathed. This is the physiological statement of the act of breathing, but the phenomena cannot be explained by either mechanistic or vitalistic interpretations.

Haldane says that breathing is dependent on the integrity of a very small area of the brain in the me-

(1). Cf. Delage: L'Heredité, Paris, 1903, p. 435.

(1)
dulla oblongata, known as the respiratory centre.

If this respiratory centre is destroyed then all signs of co-ordinated breathing efforts disappear. Furthermore, if the nervous connections between this centre and the respiratory muscles are severed, the latter become paralyzed. This constitutes the inner environment upon which the physiology of breathing largely depends. The respiratory centre may be considered to be a mechanism which reacts to slight changes in the concentration of water. The regulation, even if it be a mechanism, is utterly mysterious from the physical and chemical standpoint, and necessitates the assumption of a special guiding force, and this may be regarded, not as "entelechy", or as "elan vital", but rather as the brain controlling the respiratory centre itself.

The process which we may designate as cell nutrition or cell respiration, is a sort of storage comparable to growth. The substance which forms this secretion comes from the outside environment. The living structure is alive and full of molecular activity. "Substances are constantly being taken up from and given off to the environment", says Haldane, "and even when these substances do not seem to be used up in adult nutrition, as for instance in the case of inorganic salts, there is a constant molecular interchange between the cell and its environment. This is proved by the

(1). Haldane, op. cit., p. 5.

fact that, as was first shown in particular by Sidney Ringer, the tissues are extremely sensitive to the slightest changes in the concentrations of inorganic salts in their environment."⁽¹⁾

The living organism, therefore, bears but little resemblance to a machine. The component parts of the machine are stable so far as the immediate environment is concerned, and it makes no difference whether the machine is in action or at rest. This sort of stability does not, however, exist in the living organism; if it reacts in a constant manner to a given change it is because the internal environment is constant or normal. This constancy of the internal environment does not depend upon the structure of the organs which regulate, since close examination shows that this is, on the other hand, dependent on the constancy of the internal environment. This phenomena cannot be explained by the action of the external environment which is less constant and tends to disturb the internal environment. It is mainly through the activities of the nervous system that the body is, in the higher organisms, in relation with the external environment. Response to heat, light, gravity, and other stimuli are registered through the nervous system. The regulation of the external environment is thus only the outward extension

(1). Haldane, *ibid*, pp. 66-67.

of the regulation of the internal environment. The environment determines the nervous reactions, and the nervous reactions determine the environment; but the constancy of regulation must be explained by the activity and self-assertiveness of the organism itself. To reach any other conclusion would mean merely to relapse into vitalism. An "entelechy" or directing energy need not be supposed. The complexity of the nervous system which centers in the brain can account for this regulation of the environment, both external and internal.

The behavior of organisms largely differs. What we have been describing is the function of the structures which determine the behavior of the higher organisms, such as man. In the unicellular organisms, however, the behavior is nearly altogether determined by the environment. The response of unicellular organisms to stimuli can be almost exactly determined in advance. The behavior may be regarded as tropistic, as Jennings and others have pointed out. They respond toward the light, toward heat, toward pressure, and indeed are almost entirely controlled by the environment. An illustration of this may be seen in the contractility of the amoeba when irritated by either light or pressure.

The behavior of more complex multicellular organisms, which are below man, is largely determined by the environment, but only partly so. Their behavior, too,

is tropistic. They respond much as the action of the environment dictates. The environment, however, cannot control the instincts which these higher organisms have. An illustration of this is seen in "the eel migration"⁽¹⁾ which Mr. E. S. Russell describes. The eel has a brain of a low order, and is not at all to be regarded as having a mental life, such as may be present in the more intelligent birds and mammals. The eels of northern Europe begin their life in the ocean to the west of Ireland. The young eel is spawned and rises to the upper warmer waters as a transparent, flat, knife-blade-like larva about three inches in length and colorless except its eyes. It gradually becomes transformed into a glass eel, shorter in length, and like a knitting needle in girth. After a few months it passes up the inland streams and into the ponds where it matures and fattens. It does not breed, however, in fresh water. After some years they become restless and start a migration into the waters of the deep sea, becoming silver-like in color as they go. They migrate hundreds of miles back to their original habitat, i.e., the deep sea to the west of Ireland. This cannot be explained as being due to the action of the environment; it must be due to a deep-seated instinct inherent in the eel which causes this complex behavior. It is instinct that causes the originally deep salt-water eel, which has colonized fresh water, to return to salt-

(1). E. S. Russell: "Vitalism", Rivista di Scienza, April, 1911.

water again to spawn. The salmon, a fresh water organism, has taken to salt water, but each year it returns to fresh water, going up high falls and cascades, returning to its birth place to spawn. No matter how many falls it must jump over, or how rigorous the hardships may be - the salmon returns to inland streams to spawn and die. Both of these are phenomena which mechanism with its physico-chemical parallelism cannot explain.

The behavior of organisms proceeds in a series of steps, simple or complex, just as the organism is simple or complex. Among the infusoria^{ia} the behavior is very simple. No matter what the stimuli may be the response is the same, and expresses itself through irritability and conductivity. The behavior of the protozoa is a little higher, and seems to present the rudiments of a trial and error method. But in the behavior of the higher mammals, intelligence seems to play some little part, as Thorndike has clearly shown. He found, however, that the behavior was predictable, that the same situation will, in the same animal produce the same response. Thorndike regards that "every response or change in response of an animal is then the result of the interaction of its original knowable nature and the environment." (2) But Thorndike regards the higher

is /
use of Thorndike
Infusoria
Protozoa

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(1). E. L. Thorndike: Animal Intelligence, N. Y., 1911.
(2). Ibid, p. 242.

animals as capable of learning new ways of doing things, although their capacity for learning is more or less low.

When we come to man we have more complex behavior. There seems to be actual correlation between the static and the dynamic aspects of behavior, and between structure and function. The growth in the number, speed of formation, permanence, delicacy and complexity of associations reaches its fullest development in man. Thorndike says: "The neurones which compose the brain and the connections between which are the physiological parallels of the habits that animals form, show, as we pass down through the vertebrate series, an evolution along lines of increased delicacy and complexity. That an animal associates a certain act with a certain felt situation means that he forms or strengthens connections between certain cells. The increase in number, delicacy and complexity of cell structures is thus the basis for an increase in the number, delicacy and complexity of associations."⁽¹⁾ Thus the increased delicacy and complexity of the cell structures in the human brain, which give the possibility of brain processes and connections, makes conceptual thinking possible. This it is that makes human behavior of a higher type than that of animals. The intellectual evolution of the race, therefore, consists in an increase in the number, delicacy, complexity, permanence and speed of the formation of associations; and this unquestionably modifies the behavior

(1). Ibid, p. 237.

of man so that it becomes possible for him to largely control both his internal and external environment. We have thus a series of acquired activity complexes, which surely cannot be explained in mechanistic terms, or to be accounted for by the activity of the physical environment.

The conclusion which we have thus reached is that the environment, while it has a very great and considerable influence on the organism, does not control the behavior of the higher organisms, in particular, man. The delicacy and complexity of the nervous structures, which center in the brain are such that the response of man to the stimuli from the environment cannot be predictable. Mind is thus a factor in the evolution of the race, and is also a factor in the determination of the behavior of mankind. The living organism (man) is not passive, but active, not mechanical in its reactions to the environment, but self-assertive, plastic and largely self-determining. The environment, economic and geographical, plays a great part in the life cycle of the individual, but not the whole part, as we have seen. The "organicist" theory which Dr. Haldane has proposed has demonstrated this. This theory does not insist that the organism altogether controls its environment, but that it does in some measure determine what its environment is to be; and in

that sense is independent of its environment. The environmental factors, although extremely important by reason of furnishing the raw material with which the organism must work, are in themselves insufficient to furnish an adequate theory of the social forces.

CHAPTER III

**HEREDITY AND VARIATION
(THE BIOLOGICAL FACTORS)**

CHAPTER III

HEREDITY AND VARIATION

The importance of the biological factors in sociology must not be minimized, for they are one of the unchanging, almost immutable, facts of organic life. The individual life is in large measure determined by what it has to begin with, because of its hereditary relation to parents and ancestors. Thus we cannot afford to disregard the facts of heredity in our explanation of the past, our behavior in the present, and the prediction of our probable behavior in the future. Great importance to be sure must be given to environmental factors such as soil, climate, food, geographical position, technology, etc; and to the psychical factors in their broadest sense; but all of these merely act upon an organism whose fundamental nature is determined, although not exactly rigidly fixed by its heredity. As Herbert Spencer has said, inherited constitution must ever be the chief factor in determining character.

Heredity may be regarded as a condition of all organic evolution. The variations which go to make up progress or retrogression have direct racial importance because they are transmissible; although acquired characters, on the other hand, are never transmissible.

Thus in the study of heredity we are concerned with the
 (1)
 origin of life itself. As J. Arthur Thomson has well
 said: "Every living creature arises from a parent or
 from parents more or less like itself; this reproductive

- (1). Many definitions of heredity have been given. "The word heritage", says Francis Galton, "has a more limited meaning than nature or the sum of inborn qualities. Heritage is confined to that which is inherited, while nature also includes those individual variations that are due to other causes than heredity and which act before birth". (Galton: Natural Inheritance, p. 293). A more precise, though less exact statement is made by Professor Karl Pearson, who says that "heredity is the law which accounts for the change of type between parent and offspring, i. e., the progression from the racial towards the parental type". (Pearson: The Grammar of Science, p. 474). A longer and perhaps better definition is that given by Lankester, which is as follows: "Living matter has the special property of adding to its bulk by taking up the chemical elements which it requires and building up the food so taken as additional living matter. It further has the power of separating from itself minute particles or germs which feed and grow independently and thus multiply their kind. It is a fundamental character of this process of reproduction that the detached or pullulated germ inherits or carries with it from its parents the peculiarities of form and structure of its parent. This is the property known as heredity. It is most essentially modified by another property - namely, that though eventually growing to be closely like the parent, the germ (especially when it is formed, as is usual, by the fusion of two germs from two separate parents) is never identical in all respects with the parent. It shows Variation. In virtue of Heredity the new congenital variations shown by a new generation are transmissible and are transmitted to their offspring when in due time they pullulate or produce germs". (E. Ray Lankester: Kingdom of Man, p. 10.) Lock[†] considers heredity as "the transference of similar characters from one generation of organisms to another, a process effected by means of the germ-cells or gametes". Lock gives a fuller definition in the same work where he says, "by inheritance we mean those methods and processes by which the constitution and characteristics of an animal or plant

or genetic relation has a visible material basis in the germinal matter (usually egg-cell and sperm-cell) liberated from the parental body or bodies; by inheritance we mean all the qualities or characters which have their initial seat, their physical basis in the fertilized egg-cell; the expression of this inheritance in development results in the organism. Thus heredity is no entity, no force, no principle, but a convenient term for the genetic relation between successive generations, and inheritance includes all that the organism is or has to start with in virtue of its hereditary relation." (1)

Thus it becomes the business of heredity to investigate the precise nature of this genetic relation in the diverse forms of reproduction and to determine the relation in which a liberated germ-cell or gamete stands to the body which liberates it, or the relation in which a fertilized ovum stands to the germ-cells of the body in which it develops. It also seeks to determine what con-

are handed on to its offspring, this transmission of characters being, of course, associated with the fact that the offspring is developed by the processes of growth out of a small fragment detached from the parent organism." (Lock: Recent Progress in the Study of Variation, Heredity and Evolution, p. 292 and p. 1). A pithier definition is that given by Professor Castle, who says: "By heredity, then, we mean organic resemblance based on descent". (Castle: Heredity, p. 6). All of these definitions carry within themselves the same principle - namely, that heredity is the transmission of the physical qualities of one generation to the one arising from it; and variation is the unlikeness arising between parent and offspring.

(1). Thomson: Heredity, p. 6.

tribution has been made by parents and ancestors to the new organism. Logically, heredity is concerned with all agencies which in any way affect, condition, or limit the coming into being of a new organism or a new race. This evolutionary aspect of heredity has forced man to entertain thoughts of the future of his own race, and to take measures to control that future, a matter formerly left largely to chance. As man understands more fully and perfectly the facts and workings of heredity he will be the better enabled to insure and secure his own future. The existence of civilized man must ultimately depend upon his ability to produce from the earth in sufficient abundance cultivated plants and domesticated animals. This is furthered by a careful study and logical working out of the principles involved in heredity. Thus we see that civilization had its beginning in the attainment of such knowledge and is limited by it at the present time. It need not, however, lead to a "stock breeder's" theory of heredity or of sociology; it only means the full recognition of the importance of the principles of heredity and variation in their effect upon civilized human life.

If heredity is the transmission of the physical qualities of the race, what is the basis of that transmission? Haeckel said more than fifty years ago that "we may regard the nucleus of the cell as the principal organ of inheritance", a prophecy which has proved

(1). Haeckel: General Morphology, p. 288.

true. Another writer thirty-four years later wrote:
 "The cell is not only the seat of vital activity, but is also the vehicle of hereditary transmission; and the life of successive generations of living beings shows no breach of continuity, but forms a continuous vital stream in which, as Virchow said, rules an 'eternal law of continuity.'⁽¹⁾ The germ-cell is the vehicle of hereditary transmission. The individual life of the majority of plants and animals begins in the union of the sperm-cell and the egg-cell. These microscopic individualities unite to form a new individuality, which develops into a creature like to, and yet different from its parents. The physical basis of inheritance, therefore, is in the fertilized ovum. Although a few exceptions may be found the vast majority of living organisms⁽²⁾ begin life in a fertilized egg-cell.

(1). E. B. Wilson: The Cell in Development and Inheritance, p. 76.

(2). The following scheme from Thomson (Heredity, p. 29) shows how each new life begins as a fertilized egg-cell, and illustrates the diverse modes of reproduction in unicellular and multicellular organisms:

- I. In unicellular organisms.
 1. By division into two.
 2. By budding, a modified form of division.
 3. By sporulation or division into many units.
 The reproduction may be wholly asexual:
 1. In the sense that there is nothing corresponding to fertilization or amphimixis.
 2. In the sense that there are no special germ-cells. But in many unicellular organisms there are elaborate processes of amphimixis.
2. In multicellular organisms:
 1. Without special germ-cells, e.g., by division of the body, by giving off buds (and as the

We are not, however, concerned here with reproduction in unicellular organisms. Instead we are directly concerned with reproduction in multicellular organisms in which fertilization takes place by direct contact of the male spermary with the female ovum and the fertilized egg-cell gives rise to an embryo. In all the higher animals and plants a new individual arises, by what we may call a sexual process, from the union of two minute bodies called the reproductive cells. They are an egg-cell or ovum, furnished by the mother; and a sperm-cell, or spermary, furnished by the father. There is a great difference in size between egg and sperm. The egg is many thousand times greater in bulk, a large part of which serves as food for the new organism, furnishing it with building material until such a time as it can begin to secure food for itself.

In the primitive male sex cells, which are twelve, there are six groups, each containing four chromosomes. Then a spindle is formed, after which the cell divides and the nucleus of each cell contains twelve chromosomes.

*This is either
technically
incorrect or
not clear.*

result of artificial cutting)

2. With special germ cells.

1. Eggs from one parent are fertilized by sperms from another parent - heterogamy, the commonest mode.
2. Eggs from one parent are fertilized by sperms from the same (hermaphrodite) parent - autogamy, a very rare mode.
3. Eggs may develop without fertilization - parthenogenesis.

*The word spermary - takes
it and shows a spermatogonium.*

Then the process of division is repeated in each.

A reducing cell division follows so that each of the four new cells contains six chromosomes. These are the immature sperms. The protoplasm of each, in a majority of cases, undergoes a great elongation so that the sperm has a long tail. Maturation is now complete. Thus the sperm or male gamete is a true cell, especially modified in most cases for active movement, and is now known as a gamete.

The ova arise from primitive sex cells resembling those which give rise to the sperms. They divide and give rise to the female egg-cells, which do not immediately undergo division but remain passive and increase in size by the absorption of nutriment from the surrounding parts, and in this way each female egg-cell gives rise to an ovum. Before the ovum is ripe for conjugation with a sperm, or able to undergo the first stage of segmentation, it has to go through a process known as maturation, which consists essentially of a twice repeated process of cell division, and resembles the process described in the case of the sperms. Thus a female gamete is formed. A zygote results from the union of two gametes in fertilization, an egg with a sperm, and fertilization is complete. The result is a new organism, at first a single cell, but later an embryo comprised of many cells, and at birth a

new individual of the race to which its parents belong.

Various theories of heredity have been proposed, all of which center around the evolution theory, which is an attempt to explain the present condition of the world in terms of simpler pre-existing conditions.

One of the earliest attempts to develop a systematic
(1)
theory of evolution was that made by Lamarck.

Lamarck's theory was a linear theory of evolution and was closely bound up with the theory of the inheritance of acquired traits. Lamarck supposed that the effects of the environment are cumulative from generation to generation so that long continued growing in rich soil would produce a more luxuriant race, while continued growing in poor soil would produce a different and smaller race. Lamarck also regarded that new physical needs would cause new variation; i. e., if an animal needed a horn to fight with or teeth to chew with, that this need would cause the production of horns and teeth respectively. He further regarded use and disuse as a factor in variation. The use of an organ, such as the arm or leg, causes it to increase in size and strength; while conversely disuse causes decrease in size and efficiency. Lamarck believed that variations of every sort are inherited. Those which resulted from the direct action of the environment, or from use and disuse, he regarded as acquired traits, and considered

(1). See Thomson: Heredity, upon Lamarck's theory.

them inheritable.

Darwin's view of evolution was from the standpoint of natural selection. He held that plants and animals tend to multiply more rapidly than it is possible for them to exist; and that more offspring are produced by even the slowest breeding animals and plants than can possibly find sustenance. This result of overproduction causes the individuals that are born to engage in a constant struggle for the opportunity to survive. This becomes a struggle for existence in which the fittest only will survive. In regard to variation Darwin believed that all plants and animals show a large amount of diversity among themselves, and, as a result, some are better fitted or equipped for the struggle for existence than others. By the laws of heredity individuals transmit their own characteristics to their offspring. When an individual survives in the struggle for existence by virtue of some special characteristic, it will transmit this characteristic to its offspring, which will inherit it, and in the course of a few generations the only individuals left alive will be those that have it, while the rest will be exterminated through the operation of the law of natural selection. ⁽¹⁾

(1). Charles Darwin: Domestication of Plants and Animals, London, 1868.

Herbert Spencer was the champion of evolution from the standpoint of philosophy. He tried to explain the structure of living substance, (protoplasm), in harmony with the chemical explanation of lifeless substance then current. He regarded that these structural units of protoplasm were comparable with the molecules of chemical compounds, each kind of protoplasm within the body being composed of a different kind, or kinds, of units, which he called "physiological units". He regarded that they carry within themselves the traits of the species, of the ancestors, of the parents, and even of the individual organism itself. The fundamental traits which are concerned with the structure of the species must be unchangeable, while superficial traits can be modified without much difficulty. These modified traits which express variations in the parents and immediate ancestors, though unstable, must be considered as capable of becoming stable in time. Further, Spencer supposed "an unceasing circulation of protoplasm throughout an organism", which in time is eventually gathered into sperm-cells and egg-cells, and which also bear these traits. He regarded sperm-cells and egg-cells are essentially nothing more than vehicles in which are contained small groups of physiological units which determine the likeness of offspring to their parents. ⁽¹⁾ Thus Spencer's

use of word
as before.

(1). Herbert Spencer: Biology.

theory of heredity becomes a neo-Lamarckian contention for the inheritance of acquired traits.

Another theory along the lines of natural selection is that of Weismann, who held to "the continuity of the germ plasm". A comprehensive statement of this view is found in Weismann's own work.

(1) "In each development a portion of the specific germinal plasma (Keimplasma), which the parental ovum contains, is not used up in the formation of the offspring, but is reserved unchanged for the formation of the germinal cells of the following generation.

(2) What is actually continuous is the germ-plasm - of definite chemical and special molecular constitution. A continuity of germinal cells is now rare; a continuity of intact germinal plasma is constant.

(3) This germ-plasm has its seat in the nucleus, is extremely complex in structure, but has nevertheless an extreme power of persistence and enormous powers of growth. (4) The germ-substance proper must be

looked for in the chromatin of the nucleus of the germ-cell, and more precisely still in those ids or chromosomes which we conceive of as containing the primary constituents of a complete organism. Such ids in larger or smaller numbers make up the whole germ-plasm of a germ-cell, and each id in its turn consists of primary constituents or determinants, i.

e., of vital units, each of which determines the origin and development of a particular part of the organism. (5) The splitting up of the substance of the ovum into a somatic part, which directs the development of the individual, and a prorogative part, which reaches the germ-cells and there remains inactive, and later gives rise to the succeeding generation, constitutes the theory of the continuity of the germ-plasm, which I first stated in a work which appeared in the year (1) 1885." Weismann called the cells which collectively make up the body the soma; while those undifferentiated cells destined for reproduction he called germ-cells, or collectively the germ-plasm. He maintained that the germ-cells, since they are not descended from the body-cells, but only from the fertilized egg-cell, have no way of transmitting body-modifications, i. e., acquired characteristics.

Francis Galton was the founder of biometry, which is an attempt to statistically measure variation. But the main contribution made by Galton was his law of ancestral inheritance which was as follows: "The two parents contribute between them on the average one-half or (0.5) of the total heritage of the offspring; the four grandparents, one-quarter, or $(0.5)^2$; the eight

(1). Weismann: The Evolution Theory, Trans. by J. Arthur Thomson and M. R. Thomson, London, 1904, Vol. I, p. 411.

great-grandparents, one eighth, or $(0.5)^3$, and so on.

Thus the sum of the ancestral contributions is expressed by the series $(0.5) + (0.5)^2 + (0.5)^3$, etc., which being equal to 1 accounts for the whole heritage." (1)

This theory of heredity as proposed by Galton is not accepted today as authoritative, and is far from reconcilable with Mendelian heredity, which is held for the most part by leading biologists.

Darwin had collected much data regarding variations in plants and animals, and after his death this work was carried on by Bateson. Bateson stated in 1889 that variations fall naturally into two classes, continuous and discontinuous. Continuous variations, he regarded as those which are graded, the extremes being connected by a complete series of intermediate conditions; while in discontinuous variations there are wide gaps in which no intermediate stages are present. Discontinuous variation, he regarded, as more important in species formation because it helped to simplify natural selection. In discontinuous variations the less fit perished through the operation of the law of the survival of the fittest. Thus Bateson practically held to the mutation theory. (2)

(1). Francis Galton: The Average Contribution of Each Several Ancestor to the Total Heritage of the Offspring, 1897, p. 402.

(2). W. Bateson: Materials for the Study of Variation, 1894.

great-grandparents, one eighth, or $(0.5)^3$, and so on.

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The mutation theory of heredity that new races and species originate discontinuously and not gradually, received its strongest support from the work of the Dutch botanist, Hugo De Vries, who applied experimental methods. He began his work by studying the variations of species of plants in the field, transferring the variations to his garden and there subjecting them to selection. What Bateson regarded as discontinuous variations, De Vries speaks of as "fluctuating". In the preface to his work published in 1905, De Vries says: "The current belief assumes that species are slowly changed into new types. In contradiction to this conception the theory of mutation assumes that new species and varieties are produced from existing forms by sudden leaps. The parent-type itself remains unchanged throughout the process, and may repeatedly give birth to new forms. These may arise simultaneously and in groups, or separately at more or less widely distant periods..... My work claims to be in full accord with the principles laid down by Darwin, and to give a thorough and sharp analysis of some of the ideas of variation, inheritance, selection, and mutation, which were necessarily vague at his time." (1) De Vries in his experiments with the evening primrose developed more than a dozen new types. Some of these mutants were feeble,

(1). Hugo De Vries: Species and Varieties, their Origin by Mutation, 1905. (Preface).

and their variability fluctuated. They varied from the parent type in size, vigor, productivity, pigment and fitness to survive. On the whole the success or non-success of the mutant depended upon its fitness to survive in the struggle for existence.

Perhaps the greatest contribution to the theory of heredity was that made by Gregor Johann Mendel, who in 1866, after many years of patient experimentation reached a very important conclusion in regard to the inbreeding of hybrids, which is known as "Mendel's Law". Mendel used the edible pea, (*Pisum sativum*) in his experiments. He found seven differentiating characters which could be relied on: (1) The form of the ripe seeds, whether roundish, with shallow wrinkles or none, or angular and deeply wrinkled. (2) The color of the reserve material in the cotyledons - pale yellow, bright yellow, orange, or green. (3) The color of the seed-coats, whether white, as in most peas with white flowers, or grey, grey-brown, leather brown, with or without violet spots, and so on. (4) The form of the ripe pods, whether simply inflated, or constricted or wrinkled. (5) The color of the unripe pods, whether light or dark green, or vividly yellow, this color being correlated with that of stalk, leaf-veins, and blossoms. (6) The position of the flowers, whether axial or terminal. (7) The length of the stem, whether

(1)

tall or dwarfish.

Mendel proceeded to make crosses between these hybrids, and found that each showed one of each pair of contrasted characters to the total, or almost total, exclusion of the other. He called the character which prevailed the dominant, and the character that was suppressed, the recessive. The result was that in crosses between the plant with the dominant character with one possessing the recessive character the offspring resembled the dominant parent in regard to that characteristic. He further obtained the law of the splitting of hybrids, or segregation, by allowing these cross-bred plants to fertilize themselves, with the result that their offspring exhibited the two original forms, on the average of three dominants to one recessive. The recessive character, fertilizing themselves, bred true. The dominants, however, when allowed to fertilize themselves, produced one-third of pure dominants, and two-thirds of cross-bred dominants, which upon a second self-fertilization gave rise to a mixture of dominants and recessives in the proportion of 3 : 1. This theory of heredity is the one accepted by practically all leading biologists at the present time. A very clear summary of it is given by R. C. Punnett, who states the result thus: "Whenever there occurs a pair of differ-

(1). This summary of Mendel's work is taken from Thomson: Heredity, p. 338. Mendel's original work is entitled, Experiments in Plant Hybridization, Tr. by Bateson, 1901.

entiating characters, of which one is dominant to the other, three possibilities exist: there are recessives which always breed true to the recessive character; there are dominants which breed true to the dominant character; and are therefore pure; and thirdly, there are dominants which may be called impure, and which on self-fertilization (or in inbreeding where the sexes are separate) give both dominant and recessive forms in the fixed proportion of three of the former to one of the latter."⁽¹⁾

The theory of heredity that will be advanced in this thesis is a combination of the Mendelian view and Weismann's theory of the continuity of the germ plasm. That is to say, changes in the new organisms can take place only through changes in the germ plasm of the parent; and any variation in the species must follow the Mendelian lines of dominance and recession. Although new species may arise through mutation, these mutations are largely controlled by Mendelian law, and must be regarded as being the result of a change or changes in the germ-plasm of the adult organism.

We will now consider some of the problems of heredity. The problem of reversions or atavisms is one that long puzzled biologists. To it Darwin repeat-

(1). R. C. Punnett: Mendelism, Cambridge, 1907, p. 63.

edly called attention. He regarded, however, that this was partly due to environmental influences, and partly due to the effect of cross breeding which may at times reawaken slumbering ancestral traits. He noticed that when rabbits of various species are turned loose in a warren together, they tend to revert to the gray-coated appearance of wild rabbits. These reversions are now explained by Mendelian principles, namely, that a trait of an ancestor is apt to show itself in the present or a later generation. Around the term "reversion" many false and erroneous ideas have gathered themselves, as Bateson pointed out. He remarked that "it would probably help the science of biology if the word 'reversion' and the ideas it denotes were wholly dropped, at all events until variation has been studied much more fully than it has yet been." ⁽¹⁾ Practically all reversions, however, can be accounted for by applying the Mendelian principles of variation. . For instance, if a black child is born to white parents, careful investigation will show that there was negro blood in the family at some previous time, in some ancestor. "Atavism" is slightly different from "reversion", because it is the falling back to a prototype, from which the ancestors have been evolved. This would be quite possible, according to the laws of dominance and recession,

(1). W. Bateson: Materials for the Study of Variation, London, 1894, p. 78.

but cases of atavism are exceedingly rare. Reversion, on the other hand, is simply variation, following the Mendelian dominant and recessive characters. Both reversion and atavism must be regarded as being largely due to cross-breeding, or hybridization.

The problem of "telegony" is of little moment as it has been discarded and discredited by practically all scientists. It was supposed to be the influence of a previous sire on offspring subsequently borne by the same female to a different sire. The classic case is that of Lord Morton's mare, an Arabian, which bore a colt to a quagga. She was afterwards bred to a black Arabian horse, and produced two colts, which showed some of the characteristics of the quagga. (1) These supposed reversions, however, can be accounted for by variation, or by the reappearance of latent ancestral characters. The old belief in telegony is absolutely unfounded, and supposed cases are either striking coincidences or else variations to be accounted for by Mendelian principles.

The problem of the inheritance of acquired traits is of more importance because it is still held by some scientific men. The theory of the inheritance of acquired traits, as we have already pointed out, was best stated by Lamarck, who systematized it. He

(1). Thomson: Heredity, p. 144-145.
 (2). See p. 67.

thought that variation was due either to the direct action of the environment, or to use or non-use. This, if true, would reduce heredity largely to the action of the environmental forces which play upon the individual organism. We have neo-Lamarckians still with us, so that this theory must be refuted. Those who hold to the inheritance of acquired traits contend that there can be structural changes in the body, induced by some change in use or disuse, or by a change in the environment, which affects the germ-cells in such a specific way that the offspring will through inheritance exhibit in more or less degree the modification which the parent has acquired. The inheritance of vestigial organs which are no longer used is one of the proofs which the Lamarckians offer. Every one of us is a walking museum of such relics, such as the unused muscles of the ear, the rudimentary third eyelid, the vermiform appendix, gill clefts of mammals, etc. This, however, does not prove that the unused organs were not inherited. Similarly, it is claimed that sunburn, the tanning of the skin, etc., are inheritable. These things are not proved through thorough, careful investigation. It is not to be denied that the child inherits the acquired traits of his ancestors, and much of their culture or civilization; but he does not receive this through physical heredity. On the other hand,

this is social heredity, which Baldwin says is "analogous to physical heredity."⁽¹⁾ He says that "it is hereditary in the sense that the child cannot escape it. It is as inexorably his as the color of his eyes and the shape of his nose. He is born into a system of social relationships just as he is born into a certain quality of air. As he grows in body by breathing the one, so he grows in mind by absorbing the other."⁽²⁾ This is the social inheritance of acquired traits, but it does not have a physical basis at all. Baldwin summarizes the differences between physical and social heredity thus: "Plasticity, therefore, on the one hand, and fixity, on the other hand, sum up the differences between social and physical heredity on the side of the organism; while high consciousness, seen in attention, voluntary imitation, concentration, on the one hand, and low, dreamy, diffused subconscious processes, on the other hand, serve to define the distinction on the side of the mental life itself."⁽³⁾

Weismann, perhaps more than any other, has discredited the Lamarckian contention for the inheritance of acquired traits. He regarded acquired characters as those which result from external influence upon the

(1). J. Mark Baldwin: *Social and Ethical Interpretations*, Macmillan, N. Y., 1906, p. 67.

(2). *Ibid*, p. 68.

(3). *Ibid*, p. 73.

organism, in contrast to such as spring from the constitution of the germ. Characters, however, can be inherited only in so far as their rudiments are already contained in the germ-plasm. Bodily modifications, affected by environment or by use and disuse, cannot be transmitted to the germ-cells from which the next generation springs, and therefore, cannot play any part in the determining of the species. To show the biological soundness of Weismann's conclusion that body (soma) and germ-plasm are anatomically and physiologically distinct, Professor Castle and Dr. Phillips performed an experiment upon female guinea pigs. The ovaries of a female albino guinea pig were removed, and the ovaries of a female black guinea pig substituted in their place. When mated with an albino male, which should have produced albino pigs, the offspring were all black. She produced by the albino male three litters of young, all of which were black. The transplanted ovarian tissue remained in its new environment from four to ten months before the eggs attained full growth, which would be ample time for the influence of a foreign body to influence the inheritance if such were possible. (1)

Other experiments have attested the soundness of the theory of Weismann and the unsoundness of the Lamarckian position. Professor Tower carried on extensive

(1). Castle and Phillips: On Germinal Transplantation in Vertebrates, Car. Inst. Pub., No. 144, 1909.

experiments upon potato beetles in which variations in temperature and humidity of the environment have been followed by variations in pigmentation. He interpreted his observations, as would Weismann, that they showed, not inheritance of acquired characters, but direct modification of the germ-cells, independent of the body. (1)

However, Professor Tower's experimentations are not to be regarded as conclusive because not reported in sufficient detail, and because only certain individuals were so modified. Yet, such experiments have unquestionably proved that acquired traits are non-inheritable; and that before characters or traits can be inheritable, there must be modifications of the germ-plasm.

The problem of heredity and disease needs but little comment. Cases of disease acquired by a parent and by him transmitted to his offspring are frequently reported; but all of these cases are capable of being explained by the operation of other causes. In some cases, the disease germ may be conveyed directly into the body of the parent organism through a parasite, and thus pass directly into the reproductive cells. In the case of Texas fever in cattle, the disease is caused by a protozoon which is introduced into the blood of cattle by a tick which carries the disease germ. The protozoon parasite is present in the egg-cell of the tick, so that the young tick which develops out of an infected

(1). W. L. Tower: An Investigation of Evolution in Chrysomelid Beetles of the genus *Leptinotarsa*, Car. Inst. Pub., No. 48, Washington, 1906.

egg cannot fail to contain the parasite, but the disease is no more inherited than a grain of sand lodged within the egg would be inherited.⁽¹⁾ Similarly, in man syphilis may be transmitted, but cannot in any true sense be inherited. Tuberculosis may be transmitted from parent to child because of the unusual opportunity for post-natal infection. That does not, however, justify any conclusion that tuberculosis is inherited. It is now generally admitted that mutilations are not inheritable. There have been cases where a parent who has suffered a mutilation through accident has produced offspring similarly defective. Such cases, however, are to be regarded as variations, or as astonishing coincidences. Despite the fact that the tails of sheep have been docked for many generations there has been no racial shortening of the tail. Weismann cut off the tails of mice for nineteen generations in succession without observing any inheritance of the mutilation. Similarly, although circumcision and tatooing have been practiced for many generations, yet they are not inheritable in the slightest degree. The conclusion to be reached is that disease is certainly not inheritable. Acquired diseases are not transmissible from parent to offspring unless the germ-plasm is modified either through malnutrition, or possibly inbreeding, in which

(1). Castle: Genetics and Eugenics, 1916, pp. 29-30.

(1)
cases the disease or defect may be transmissible.

The problem of heredity and Mendel's law is not a problem at all. The law is "the law of heredity". It contains three distinct principles: (1) The existence of unit-characters; (2) dominance, in cases where the parents differ in a unit-character; and (3) segregation of the units contributed by the respective parents, this segregation being found among the gametes formed by the offspring. Professor Castle has proved by his extensive experimentation on guinea-pigs and mice that (2) the Mendelian principles hold good in every case.

Dominants are present as compared to recessives in the proportion of three to one.

In applying these principles to inbreeding and cross-breeding, as is necessary in the breeding of stock, the breeder can tell pretty definitely what the result will be. Certain results from hybridization have been obtained. The hybrids may form a blend of the two parental forms; they may show a particular juxtaposition without blending; they may resemble an ancestral form; they may differ from their parents; or they may exhibit the dominant characters of one parent, with the recessive characters of the other parent remaining latent. (3)

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- (1). The dwarf stature of the Hottentot-Bushmen is probably to be accounted for on the ground of malnutrition and inbreeding.
 - (2). Castle: Genetics and Eugenics.
 - (3). Thomson: Heredity, pp. 389-390.

Professor Castle reached the conclusion that inbreeding tends to bring forth homozygous (union of gametes which transmit the same Mendelian character) combinations, which have a tendency to bring to the surface latent or hidden recessive characters. This, he thinks, may be justified in the breeding of domestic stock, but not in man. Cross-breeding tends to bring out heterozygous (union of gametes which transmit different Mendelian characters) combinations, i. e., the dominant characters that are desired. ⁽¹⁾ Professor Castle says that "the animal breeder is therefore amply justified in doing what human society at present is probably not warranted in doing, - viz.: in practicing close inbreeding in building up families of superior excellence, and then keeping these pure, while using them in crosses with other stocks. For an animal of such a superior race should have only vigorous, strong offspring if mated with a healthy individual of any family whatever, within the same species. For this reason the production of 'thoroughbred' animals and their use in crosses is both scientifically correct and commercially remunerative." ⁽²⁾

Professor Castle finds that in cross-breeding, or hybridization, that the mating of parents belonging

(1). Castle: Genetics and Eugenics, 1911, p. 223.

(2). Ibid, p. 224.

to the same pure race and closely related to each other brings about a homozygous condition in which recessive qualities are apt to be transmitted, and will have on the whole practically the same effect as self-fertilization. The mating, however, of individuals of distinct geographical races is apt to produce an offspring more vigorous than the parents. A back cross of succeeding generations will bring forth the dominant factors present in the first cross. The cross-breeding of unlike species is not good, as the offspring will either have great vigor but impaired fertility, or lack both vigor and reproductive capacity. The hybridization of like individuals of the same racial stock is apt to develop a more vigorous and more virile offspring than either of the parent stocks. An illustration of this is seen in the hybrid population which makes up Europe today. They are hybrids resulting from the crossing of the Mediterranean, Alpine and Blonde stocks. But in this case the individuals were enough alike so that no injurious results followed; instead, the offspring were more vigorous than the parents. The dominant qualities of the ancestor may manifest themselves in the progeny according to Mendelian expectations; and a hybridiza-⁽¹⁾tion of like stocks is rather to be desired than avoided.

(1). Thorstein B. Veblen: "The Mutation Theory and the Blonde Race". Art. in The Jour. of Race Development, Vol. III, No. 4, pp. 491-507.

The problem of heredity and sex is one that is still unsettled. But, if the determination of sex in general depends upon the inheritance of a Mendelian factor differentiating the sexes, it is very unlikely that the determination of sex will ever be controlled. As Professor Castle says, "male and female zygotes should forever continue to be produced in approximate equality and consistent inequality of male and female births could result only from greater mortality of one sort of zygote than of the other. Only in parthenogenesis can man at will control sex, and until he can produce artificial parthenogenesis in the higher animals, he can scarcely (1) hope to control sex in such animals."

The contention of the eugenicists from Plato to those of the present day has been a ruthless attempt to improve the human race by using the methods of the stock breeder. The family has occupied but little place in their scheme. While it is not to be denied that moral and physical defectives should not be allowed to reproduce their kind, the carrying out of the methods of eugenics on a wholesale plan seems equally dangerous. To quote Professor Castle again: "It is of course essential that the racial stock be kept sound and free from taint of disease or racial poison, but granting this, the situation is not so alarming as some persons seem to

(1). Castle: Heredity, p. 181.

think. For the normal unperverted instincts of the average man have a distinctly eugenic trend. Cupid is a safer guide in matrimony than a licensing board."⁽¹⁾ Indeed it would be necessary to manage society like a stock farm if eugenics were to be successfully carried out. This could be done most rapidly under polygamy, which would permit of a comparatively rigid selection of sires; and less rapidly under monogamy by a selection of parents of both sexes, the offspring to be reared by the community, as Plato advocated. But these methods are so contrary to the true spirit of democracy and individual liberty that no civilized community would care to tolerate either of them. All that we can do is to teach the individual all that our present knowledge of heredity has revealed. We should depend upon the dissemination of knowledge rather than upon wholesale legislation until we have more solid ground on which to stand. Thus we are forced to adopt a negative conclusion in regard to the contention of the eugenicists.⁽²⁾

We may adopt the following conclusions in the light of our study of heredity and variation: The influence of heredity is purely physical; and acquired traits, due to environmental or other forces, cannot be inherited. In fact the influence of the environment is practically

(1). Castle: Genetics and Eugenics, 1916, p. 273.

(2). Ibid, pp. 274-275.

negative so far as heredity and variation are concerned. In order that the acquired traits of the parents may be transmitted to their offspring directly there must be a modification of the germ-plasm, and such has not as yet been proved. The result of malnutrition, of alcoholism, inbreeding, etc., may be such that the germ-plasm is modified, but such cases have not definitely been worked out. For the present we are warranted in considering these factors to be mainly negative in their influence. The laws of Mendel and Weismann form the basis of any adequate theory of heredity. The inheritance of dominant and recessive qualities by the offspring proceed in the geometrical ratio of three to one; and hereditary traits are conveyed only through the irreducible germ-plasm found in the zygotes of the primitive sex cells. Heredity and variation, therefore, are not reducible to environmental factors. The environment may play a major part in the determining of what the new individual is to be, but not because it in any way affects the germ-plasm of the producing organism. Similarly, heredity is not reducible to psychical factors, although social inheritance may account for the acquisition by the individual of the acquired traits or culture of the race.

While the distinctive physical difference between man and other animals is his larger brain, which is due to the increase of the associational areas which are con-

cerned with intellectual processes, this must be regarded as the result of natural selection in organic evolution. This unquestionably was the product of a mutation which enabled man to survive in his struggle with the rest of the animal world, and hence was perpetuated by heredity and selection. In the dissimilarity of men we have the result of organic variation, some individuals being born with favorable variations, and others with unfavorable variations. Some men are born strong and some are born weak. The original endowment of the individual depends in part upon his heredity, but it is also a matter of individual variation. Thus heredity and variation account for the biological inequality among individuals. These original variations are most strikingly expressed, in human society, in the facts of sex and race, which are to be regarded as quantitative rather than qualitative; i. e., they consist in the greater strength of certain natural tendencies, or impulses in one race, or one sex, than in another.

All of this shows us how important the biological factors of heredity and variation are in the working out of an adequate theory of the social forces. Heredity and variation are factors which must be reckoned with. They do not, however, explain the handing down from generation to generation of acquired traits, which are not physical and cannot be inherited. This brings up the

further problem of the part which is played by the
psychical factors, together with the possibility of
centrally initiated nervous processes which seem to
largely guide and control the destiny of the individual.

CHAPTER IV

CENTRALLY INITIATED PROCESSES

(THE PSYCHICAL FACTORS)

CHAPTER IV

CENTRALLY INITIATED PROCESSES

From a biological point of view mental or psychical life may be regarded as a variation in the life cycle of the individual. As such it is a variation which natural selection has favored from the beginning in the organic world. The animals having the best chance to survive in the struggle for existence would not be necessarily those that had developed the greatest physical strength, but rather those which had developed the greatest intelligence, which would enable them to adapt themselves to their environment and to escape the dangers which threatened them. Thus intelligence seems to have had a survival value far in excess of mere strength. (1)

All organisms, however, do not have mental life, and some have it in only slight degree. In the organic world we have those movements and structures which appear earliest and which seem so important to simple existence as to be fundamental. (2) Then, there are those structures which develop later and which seem necessary

(1). Cf. Ellwood: An Introduction to Social Psychology, p. 30.
 (2). Cf. Bolton: Principles of Education, especially the chapter on "From Fundamental to Accessory".

only to complex existence, and which we term "accessory" because they are less vital and less necessary to existence. The lowest and most primitive organisms possess only the structures and functions which are necessary for existence. Man is not so. The lower animals perform the functions fundamental and necessary to existence fully as well as man, but they lack the power to perform the accessory movements. All animal life has undoubtedly evolved from very simple forms. Even the higher animals must have begun life as unicellular organisms, and have become gradually differentiated through the development of specialized and complex structures. The lowest organisms do not possess a nervous system and thus cannot have neural processes accompanied by consciousness. Thus it seems that the key to the intellectual or mental life is to be found in the development of a nervous system. The first portion to make its appearance was the spinal cord, which at first was a comparatively straight, undifferentiated tube. Following this, the various collateral branches forming the peripheral system with the end organs of sense were evolved. Then, there was the specialization of one portion of the nervous system which became the brain. The brain, itself, was gradually formed, the so-called different levels developing at different times. The medulla oblongata developed first, then the cerebellum, and lastly the cerebral

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This variation, due to organic selection, made intelligence possible, and, accordingly, we find a measure of intelligence in the higher animals. But some time in the far remote past our half-human ancestors reached and passed the critical point where variations in intelligence, always important, came to be still more important, and natural selection reinforced by a series of mutations in the direction of a bigger and better brain made man the intelligent creature that he is. This increase in intelligence carried with it

(2)
a prolongation of infancy. As the mental life became more and more complex, more and more had to be left to be done during the earlier years of life. Thus man came to be born with the germs of many complex activities, and a long period resulted in which his mind was plastic and malleable in order that these accessory neural connections might be developed. Intelligence seems thus to have been developed as a means of control over the more complex activities of life, and in man this was accompanied by consciousness. The mind came to assert a conscious control over the complex activities of man's life cycle - superior means of control over complex adaptive processes. As Professor

(1). Bolton, *ibid*, ch. on "From Fundamental to Accessory".

(2). Cf. Fiske: *The Meaning of Infancy*. Fiske regards that the prolongation of infancy was essential to the evolution of mental life.

Ellwood says, "intelligence and the neural processes immediately involved in consciousness constitute the master device produced by organic evolution to perfect the control of the organism over its environment."⁽¹⁾

The part which mind came to play in the life of man was that of purposive activity or active adaptation, a variation found useful and perpetuated through natural selection.⁽²⁾ Thus the mind selects the stimulus to which it responds from the many stimuli which the environment affords. With the growth of intelligence in man there came to be social life between himself and his fellows. This would come to be psychic interstimulation and response, just as soon as articulate speech and language could be evolved. Articulate speech was obviously due to man's higher intellectual development. With it came the power to form abstract ideas, and with the development of social life, centering around the food and sex processes, the complex activities of culture or civilization had their primitive origins.

The fundamental adaptations between individuals in human groups have always rested upon instincts, also evolved by natural selection; and which have formed the basis for psychic interstimulation and response between individuals of the same group. Man's instincts were inherent and transmitted to his progeny through inheri-

(1). C. A. Ellwood: op. cit., p. 31.

(2). Cf. Ellwood, *ibid*, p. 32.

tance. Along with these inherent instincts, mainly the food and sex instincts and those secondary ones arising therefrom, man also had an indefinite capacity for the formation of habits. Thus through a series of mutations man was endowed with a superior neural and mental mechanism which enabled him to rationalize his experiences and to evolve ideas and inventions.⁽¹⁾ This enabled man to control his habits and to adjust himself to the new situations which confronted him. Through the use of concepts and articulate speech he was able to hand down from generation to generation the knowledge which would likely prove useful to the group. Thus tradition and custom arose which by and by grew into the "mores" of the group, as some customs came to be approved and others disapproved.⁽²⁾

The interpretation of this more complex behavior of man cannot be given in terms of habit and environment; for while this procedure may be sufficient for animal groups it is not adequate for the much more social life of man. This is because the higher intellectual centers of the brain have become the chief organ of adaptation in man. While environmental forces have served to select and to permanently establish the intellectual traits which are inherent in man they do not

(1). This chapter has been written largely in terms of Professor Ellwood's sociology and at times it has been difficult to get away from his terminology.

(2). Cf. Sumner: Folkways, chapter one.

account for all of his subsequent behavior. Man's thinking may be largely determined by crises which have to do with the getting of food and the necessity for defense; but the higher intellectual adaptability of man enables him to make inventions which help him to largely control his environmental surroundings. The biological inheritance of man has unquestionably co-operated with his intellect in making human culture and human society a possibility. While heredity and variation have laid the foundation for development in the human as well as in the animal world, man's higher intellectual development has modified the working of these factors and made cultural evolution possible. The intellect has thus modified the development of human society and has made man's evolution a "learning process", as we shall see. ⁽¹⁾ Thus no adequate theory of the social forces can fail to take cognizance of the psychical factors, and the place which the intellect holds in determining mental interstimulation and response. The psychical factors may be classified as ⁽²⁾ instinctive, emotional and intellectual.

Instinct may be regarded as the response of hereditary structure to stimuli either from without or from within the organism; and the term "instinct"

(1). Cf. Ellwood, op. cit., Ch. two, "Organic Evolution and Social Evolution".

(2). Ellwood: op, cit., p. 7.

may be largely confined to the hereditary activities or inherent reactions which characterize a group of individuals. (1) Practically none of the psychologists agree as to the number of human instincts. In fact, some of the more extreme behaviorists deny even the existence of instincts, but since psychology is so largely based upon biology the concept of instinct, or its equivalent, cannot be avoided. The nervous system has a relatively definite hereditary structure, and relatively definite activities correspond to this structure, which need only an appropriate stimulus to set them off. Perhaps such an elaborate list of instincts as the late William James gave is to be disregarded, but after all, it is largely a question of terminology. The instincts are activities based upon hereditary connections within the nervous system. Owing to the more complex mental life of man, he naturally has a greater

(1). Baldwin defines instinct as "an inherited reaction of the sensori-motor type, relatively complex and markedly adaptive in character, and common to a group of individuals". (J. Mark Baldwin: Dictionary of Philosophy and Psychology, Vol. I, p. 555). Colvin says that "an instinctive activity is a group of reflexes organised toward some definite goal and accompanied in their expression by a consciousness correlate of more or less clearness and attended by an affective tone of greater or less intensity". (Colvin: The Learning Process, p. 35). This definition makes the mind the controlling factor in instinctive activity. McDougall defines an instinct as an "innate psycho-physical disposition which determines its possessor to perceive and pay attention to objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act

number of instincts than other animals. The two most fundamental human instincts are those connected with the getting of food and those connected with sex. Largely growing out of these two is the instinct of gregariousness which gives rise to family and group life. As men begin to live in groups, the instinct of imitation appears, which probably springs more from reflection than from native impulses. Indeed, all of the strongly imitative animals are without exception gregarious. Imitation, or doing as others do, is to be regarded as one of the most important unifying factors in human society, since it tends to make uniform the activities of groups. This naturally comes about through the medium of the mind which pronounces some acts desirable and others undesirable; and thus the human instincts come to be more and more directed by
(1)
the psychical nature of man.

The modification of these instinctive activities, which arise through experience, or the influence of the environment, may be termed "habits". Habits, then, are to be regarded as modifications of hereditary nervous structure, acquired by the individual during his

in regard to it in a particular manner, or at least to experience an impulse to such action". (McDougall: Social Psychology, p. 29).

- (1). Cf. Tarde: The Laws of Imitation. See, also, Hobhouse: Mind in Evolution; and Ellwood: An Introduction to Social Psychology, pp. 60-61.

(1)
 lifetime, but which are not inheritable. While habits are due to the action of the environment, no habit is necessarily formed by the mechanical action of the environment upon the individual. On the contrary, the individual selects the stimuli from the environment to which he responds. When the individual has responded in the same way several times to the same stimulus, and adapted himself to it, a habit is established. This becomes persistent after there have been sufficient responses, and by and by, it may become as much a part of the individual as his original nature. Habit becomes extremely important both for the individual and for society. It largely determines the behavior of the individual, because habit determines the way he will respond. Habit is thus the raw material on which cultural evolution must act; and man's capacity to acquire an indefinite number of habits lies at the very basis of civilization. (2)

Both instinct and habit, however, adjust the individual only to past environments, and are therefore inadequate in determining his future behavior. With the evolution of civilization there is a constantly changing social life, and habits must change with the changing conditions. As old habits are given up, new habits must be

(1). See Ellwood: An Introduction to Social Psychology, p. 62.

(2). This is because habits when adopted by the group tend to become "mores".

taken on, in order that man may constantly adapt himself to his environment. In this process feeling and thought play their part. (1)

Feeling furnishes an internal agency for selection wherein learning, or profiting from past experience, becomes available to the individual. Physiologically, the basis of distinction is within the feelings themselves; that is, the reaction to stimulus results in either a pleasant or an unpleasant feeling. Munsterberg says: "If the stimulus is pleasant the bodily movements tend to make it go on; if it is unpleasant, the bodily movements tend to stop it. If the stimulus is disagreeable, the organism reacts by a contraction of the flexor muscles. If the impression is agreeable, the organism expands, and the extensor muscles are active." (2)

Munsterberg regards the impression as vivid when the central excitement finds the channels of motor discharge open; and the impression as becoming localized when the central excitement is carried into a particular channel. The excitement is pleasant or unpleasant just as it is starting a movement of approach or withdrawal. (3) Thus there seems to be a strengthening or weakening of the excitement caused

(1). Cf. Ellwood, *ibid*, p. 64.

(2). Munsterberg: *Psychology: General and Applied*, N. Y., 1914, pp. 198-199.

(3). *Ibid*, pp. 200-201.

by the lower nervous centers. When strengthened the feeling experienced is that of pleasantness; when weakened, the feeling is that of unpleasantness. Thus those habits which tend to become habitual are usually accompanied by a feeling of pleasantness; and conversely, those which are not likely to become habitual do not because accompanied by a feeling of unpleasantness. Thus feeling is the reaction of the organism to an activity or a stimulus, and is largely a subjective and individualistic matter. (1) Although the hedonistic psychology which made pleasure and pain the sole motives to action, and feeling the original form of consciousness, has been given up, nevertheless, feeling does play an important part in human society. As Professor Ellwood says, "customs, institutions, and mores are embedded in feeling" and change is sometimes difficult to be obtained because of that fact. (2) Because feeling so strongly reenforces instinctive and habitual activities it has a large place in the determination of behavior, since it influences the individual's response to stimuli. It surely is to be considered a psychical factor which modifies the response of the individual to his environment.

(1). Ebbinghaus says that "feeling is a reliable symptom and witness only for the present and local utility of the relation between the organism and the world. It is not a prophet of the future. Disease may result from eating sweets, whereas medicine is often bitter". (Psychology, Tr. By Max Meyer, 1908, p. 83.)

(2). Ellwood, op. cit., p. 64.

The part which the intellect plays in the behavior of man is of even more significant importance. The intellect is that objective, cognitive side of the mind which is concerned with the adaptation of the organism to its environment. (1) Through the media of sensation, apperception, the formation of concepts, and reasoning it determines man's attitude toward his environment. Sensation functions in keeping the mind informed of bodily and environmental activities. The sense organs are nerve structures especially adapted to pick up a certain type of information. For instance, the eye responds to light sensations, the ear to sound sensations, the skin to sensations of pressure and place, the temperature spots to sensations of warmth and cold, and so on. (2) All work together in bringing

(1). Ellwood, *ibid*, p. 67.

(2). Professor Dewey says that "the brain is both anatomically and functionally a single (or, at most, dual) organ. There is, of course, a great deal of specialization, and even of localization of function within it. Centres of sight, hearing and touch are more or less spatially as well as functionally distinct. But there is reason to believe that this specialization, like the corresponding division of labor in society, is acquired, not original, resting upon the principles of economy, or the richest result with the greatest ease. Even with the most extreme localization, there is no separation of sensory centres. The centres for sight, for touch, for movement, etc., are all interwoven into one larger whole. With the movement of specialization, or differentiation, goes a movement of reunion, of interconnection. While, for example, the auditory centre may be constantly gaining in distinctness of localization, it is also

about adjustment. As Professor Bagley says: "Adjustment is the end toward which sensation is the means; ... and the process of adjustment or unifying and making significant the data furnished by sensation is known as apperception."⁽¹⁾ Through apperception the perceived object becomes apperceived and experiences are assimilated with reference to the primitive needs of the organism, which are represented by the instincts. As development continues, these primitive needs come to be overshadowed by acquired needs, which are represented by outgrowths of instincts modified by experience and assimilated.

The formation of concepts and of reasoning comes first from judgments. When we face a given situation in which past experience is consciously brought to bear upon the solution of the situation a judgment is reached.⁽²⁾ The practical judgment involves the conscious application of concrete experience, recalled in

gaining in multifariousness of connection with other sensory centres. Physiological considerations, in fine, instead of pointing to original atomic sensations, point to a massive homogeneous sensation, gradually differentiated, indeed, but at the same time, with these different sensations bound into a whole." (John Dewey: Psychology, pp. 34-35).

(1). Bagley: The Teaching Process, N. Y., 1915, pp. 66-67. Cf. Dewey, who defines apperception as "the reaction of mind by means of its organized structure upon the sensuous material presented to it".

(3). Bagley, *ibid*, p. 130.

the same sort of sensation in which it originally occurred; and the reaction is made to the present situation on the basis of the former reaction. ⁽¹⁾ Some of the higher animals are capable of such behavior, for example, the opossum shams death when confronted by danger. But in what is called the conceptual judgment, the experiences of the past become massed and condensed, and the form of judgment resulting is called the "conceptual judgment" because a process of thinking by the use of concepts is involved. This power man does not share with the higher animals; it is his alone. Furthermore, man can use the finished product of a conceptual judgment, which may itself function as a condensed experience in facing new situations. The use of conceptual judgments gives rise to reasoning, a gift which man alone possesses. Professor Dewey has admirably analyzed a complete act of thought. First, there must be the occurrence of a difficulty in which there is lack of adaptation of means to end. Second, there must follow the definition of the difficulty. Third, there must be the occurrence of a suggested explanation or possible solution through hypothesis and testing. Fourth, there is the solution of the problem

(1). See Hobhouse: *Mind in Evolution*, Ch. VI.

through the elaboration of an idea and by experimentation. Fifth, there must be a verification of the conjectural idea and the formation of a concluding belief. ⁽¹⁾ This is reasoning, an act which no animal is capable of, and an act which can in no way be attributed to environmental factors. Thus reasoning becomes the highest function of the intellect.

The neural processes involved in intelligence come to have a survival value of their own over and above instinct, habit, or feeling. Civilized man has come to depend less and less upon instinct, habit and feeling; because for him the intellect, especially the reason, has become the chief factor in the guidance of his behavior. ⁽²⁾ While the origins of social behavior are still to be found in the instincts and habits, which are largely molded by the environment, it is the intellect that makes social change or adaptation possible. It has thus been through the intellectual elements that human society has received the distinct traits which distinguish it from animal association. The intellect is to be regarded as the delicate instrument of individual and social adaptation, and must be recognized as an increasing factor, as social evolution goes on, in social change and adaptation. The intellect of man,

(1). John Dewey: *How We Think*, 1910, ch. VI, "The Analysis of a Complete Act of Thought".

(2). Ellwood, *op. cit.*, p. 68.

which results from his large brain and increased nervous connections, expresses itself, first, through the media of articulate speech, and secondly through language, which becomes the vehicle of tradition. Thirdly, through invention and discovery man has slowly succeeded in conquering the forces of nature and has adapted them to his use. ⁽¹⁾ Thus the psychical factors, which proceed from the mind, and culminate in the intellect, have a right to attention and certainly are not reducible to environmental factors.

This leads us directly to the problem of "centrally initiated nervous processes". At present, psychologists and physiologists, except possibly the radical "behaviorist" school, regard that mind plays an important part in the life of man. The mind is kept informed of what takes place in various parts of the body by means of sensations which function through the sense organs. Each of these sense organs is a nerve structure especially adapted to convey certain impression to the mind or brain. As it is necessary that the movements and life of the organism be governed in accordance with bodily needs and with the external environment, sensation furnishes the channel through which are registered the stimuli upon which adjustment must depend. Adjustment thus be-

(1). Ellwood: op. cit., pp. 70-72. See, also, Ratzel on "Invention and Discovery" in Thomas: Source Book for Social Origins, pp. 426-435.

comes the end toward which sensation is the means. This does not imply, however, that this purposeful direction of sensation is present in man from birth. Indeed, when the infant begins to receive sense impressions from the outer environment, these impressions are devoid of the same meaning that an adult would attach to them. They are not connected in a unitary impression, but remain a continuous complex of conscious changes which constitute, to use Professor James's apt characterization, "a big, blooming, buzzing Confusion." With the growth of the nervous connections during the prolonged period of infancy, these chaotic impressions begin to take on new forms, and the vague, undifferentiated mass of sensation and feeling, mainly connected with the satisfaction of hunger, comes to be resolved into purposeful units - into objects and processes that bear a direct reference to the infant's existence. When a stimulus is presented to the child a reaction follows. The stimulus gradually becomes a sensation, although the child may be conscious of it only in vague and incoherent fashion. (1) While a reaction follows a stimulus, the initiation of this reaction is unconscious, since the reaction is more or less instinctive. Gradually, how-

(1). Bagley, op. cit., p. 63.

ever, the child begins to respond to stimuli in much the same way through instinctive adjustment, and soon the stimulus comes to mean a definite type of response. As Professor Hobhouse points out, the first effect of experience upon adjustment is to confirm or inhibit an inherited reaction. ⁽¹⁾

Thus it seems that the most primitive of mental functions has its basis in the inherited structure of the nervous system, and that through instinctive adjustments the data of sensation is combined into purposeful units by means of the sensations of strain arising from the reaction. ⁽²⁾ Later the sensations of strain come to play the role of centralizing or unifying agencies, and to resolve the data with which the senses furnish us into definite, coherent and purposeful unities which go to make up consciousness. As Baldwin points out, the motor processes are extremely important in recognition and assimilation, "the sense of assimilation in each successive appearance of the same objective content varies with the different shades of attention, just as it also varies for the different sense qualities by reason of the different motor associations, strains, etc., involved in accomodating to the different sense qualities." ⁽³⁾ Again, Professor

(1). Mind in Evolution, p. 85 ff.

(2). Bagley, op. cit., p. 71.

(3). Baldwin: Mental Development, 1895, pp. 310-311.

Baldwin says, "every two elements whatever, connected together in consciousness, are so only because they have motor effects in common."⁽¹⁾ Professor Stout, also, emphasizes the fundamental significance of the kinaesthetic or motor elements when he says: "Perceptual process is penetrated through and through by experiences of movement. Passive sensations only serve to guide and define motor activities."⁽²⁾

Perhaps an even better summary of growth and development of sensation into consciousness is that given by Professor King, who says: "The differentiation of the special forms of sense experience from the primary general consciousness takes place as a function of the child's increasing demands for fuller activity. The connections are made possible on the sensory side because they have first occurred, or been made necessary, on the active side. The infant repeatedly finds the same complexes of sensations connected with a certain set of activities. The activity is a unit, and the group of eye, ear and tactual sensations become inextricably bound up with the act, and perhaps comes to be symbolic of it; the reinstatement of one of the sensations serving to call

(1). Baldwin, op. cit., p. 311.

(2). G. T. Stout: *Analytic Psychology*, London, 1896, Vol. I, pp. 212-213.

up the images of the others as it sets up the activity for which it stands. The unity is the reference of the sensations which comes in on the side of the act. Later, when the object is known as an object, the sensations are easily transferred to it, or, rather, the object seen is recognized as the one touched or seen, because it has been the basis of a previous single activity. If it were not for the connecting activity, there would be absolutely no ground on which the senses could be brought together in their reference, and thus become more than mere undefined modifications of the general tonus of consciousness..... It is only as something is done with the object and the various senses cooperate in the doing, that their unity of reference appears..... The child's first objects are really certain possible activities that are symbolized by cer-
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tain sensations involved in performing the acts."

This does not, however, necessitate the reducing of neural processes to feeling, for each sensation, of course, has its neural correlate. The stimulus from the outside or inside environment sets the sensations in motion, and this is registered in the associational areas or centres where the mind uses it as raw material in determining the reaction of the individual toward the sensation which the stimulus has set in motion.

(1). Irving King: Psychology of Child Development, 1903, pp. 36-37.

Thus it seems highly probable that the mind exists for the purpose of adjusting the organism to its environment in conformity with the sensations which keep the mind informed of the state of this environment. The arrangement of sensory systems, associational systems, and motor systems within the nervous system seems to warrant the conclusion that the ultimate test of all nervous action is adjustment; and it is in terms of adjusted response that the intermediate sensory and intellectual processes acquire meaning and significance. ⁽¹⁾

We have seen that increase in intelligence in the animal series is correlated with increase in delicacy and nicety of motor coordination. ⁽²⁾ And, as Professor Bagley says, "on the anatomical side, this delicacy of coordination is represented by an increase in the diameter of the pyramidal tracts - large bundles of fibers that carry the motor impulses from the cerebral cortex to centres in the ventral and lateral portions of the spinal cord, whence their impressions are distributed along the motor nerves to the muscles. Now the greater the number of fibers, the more complete is the control that the higher centres exercise over the bodily movement, and the more accurate are the coordinations and adjustments with which the organism can meet definite situations of the environment. As one would naturally expect the diameter of the pyramidal tracts is found

(1). Bagley, op. cit., pp. 76-77.

(2). See above, p. 56.

to be relatively much greater in man than in the lower animals. There are recognized in the cerebral cortex several distinct areas that are concerned with the registry of different sensations. Pressure, temperature, organic and kinaesthetic (motor) sensations are located in the great central region, formerly called the "motor zone", but now generally recognized as containing sensory as well as motor centres, and known as the "somaesthetic" area. The visual sensations are registered in the occipital lobes, the auditory sensations in the temporal lobes, the smell sensations in the region of the hippocampal gyre, etc.⁽¹⁾ These various sense areas occupy, however, only about one-third of the surface of the cerebral hemispheres. What is the function of the remaining areas of the cortex? Professor Paul Fleichsig of Leipzig discovered that cells in the silent areas have no direct connection with the lower centres of the midbrain and the spinal cord; i. e., they neither receive impressions from the outer world nor send orders directly to the muscles. They are, however, connected by fibers with the sense areas. The inference is that the cells in this extensive area lying between the occipital, parietal and temporal lobes receive fibers from the cells of the visual, auditory and somaesthetic areas, and that these intermediate areas function in connecting the different sense areas.⁽²⁾ If this position is

(1). Bagley: op. cit., p. 77.

(2). Paul Fleichsig: Ueber die Localisation der geistigen Vorgänge, Leipzig, 1896, Gehirn und Seele, 1896.

at all tenable, and it seems to find some support from pathology, as we shall see, it establishes a sure foundation for the view that this area is the center of "central nervous processes" which receive the sensations of the individual and conveys them to the mind, or intellect, for its selective reaction upon them. This, if valid, would prove the theory of centrally initiated nervous processes by which the individual (man) uses his mind as an important factor in the regulation and control of his environment through a ratiocination (1) process.

The mental disturbance known as "apraxia" seems to throw some light upon the problem. Individuals afflicted with apraxia cannot function normally; i. e., many of the sensations which come to them are meaningless because they are unable to grasp the significance which a normal individual attaches to objects of the everyday life. The sense organs may function perfectly; i. e., the nerves that carry the sense impressions to the cortex may be normal. The trouble is

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- (1). This theory receives some indirect support from such an objective physiologist as Judson Herrick, who says: "The term correlation is applied to those combinations of the afferent impulses within the sensory centres which provide for the integration of these impulses into the appropriate or adaptive responses; in other words, the correlation centres determine what the reaction to a given combination of stimuli will be." (Judson Herrick: An Introduction to Neurology, Phila., W. B. Saunders and Co., 1915, p. 35). This is exactly what those who contend that centrally

central in that it lies in the cortex itself. There is mental deterioration in that the patient approaches the condition of a child. He sees an object or touches it, just as the infant may, but the past experiences that should enable him to read into the object its normal meaning have become dissociated from sense and touch impressions.

In mental disturbance, there seems to be a reversal in the mental processes. As certain areas become disturbed and their function lost, the mental power of the patient decays. Dr. Diefendorf says: "In advanced deterioration self consciousness ultimately disappears. In dementia praecox and paresis this is the usual terminus of the mental life. It is to be especially emphasized, however, that this is not the result of deterioration but a special symptom of these diseases. In some cases, on the other hand, even when the store of ideas is much impoverished the patient still retains his self consciousness and can give an account of his own condition. This is particularly common in epileptics. Even in presbyophrenia, where, on account of the marked disturbance of attention, experiences disappear

initiated nervous processes control the reactions to combinations of stimuli accept. If we substitute "areas for centrally initiated nervous processes" for "the correlation" centres", we are in agreement with Herrick.

- (1). A. B. Evarts: Report of a Case of Aphasia and Apraxia, N. Y. Med. J., 1914, Vol. 100, pp. 1193 ff.

tr. entirely from memory and are replaced by the freest invention, self consciousness is retained." ⁽¹⁾ In other words, certain associational areas may no longer continue to function while others continue to function in a normal way.

Activity and self assertiveness in man are hardly to be accounted for unless certain areas in the brain do control certain acts. Thus it seems that from this anatomical and pathological evidence that centrally initiated nervous processes may function in the determination of the behavior of the individual, in determining what his reaction to stimuli must be. If this can be maintained it certainly shows that the psychical elements involved in association cannot be reduced to mere environmental or hereditary factors; and that the psychical factors predominate in shaping the raw material which the environment furnishes them, while the hereditary instincts, impulses, etc., only give the organism what it has to start with. This point of view would necessitate holding that the psychic elements involved in individual behavior are also found in the behavior of groups of individuals, or society as a whole. To this the objectivist would respond that such a subjective view leaves out of account the neural correlates involved in such subjective terms as "mind", "feeling", "idea", "belief", "value",

(1) A. Ross Diefendorf: Clinical Psychiatry, 1907, p. 61.

etc. This is not true, because the psychical processes include, of course, their neural correlates. While a stimulus may be regarded as a physical agent which acts upon sensory or motory receptors, the reaction does not always follow apart from mind. Although ideas or images cannot be considered stimuli in the sense that they may be used to account for behavior, yet their neural correlates may work much as stimuli would. Thus the idea may determine the stimuli, or, at least choose between two conflicting stimuli. In this way the mind seems to have for its main function the performance of a selective process in choosing from several stimuli the one to which the organism is to respond. In this sense thought may be regarded as the cause of our activity, if our theory of centrally initiated processes is valid, since it evaluates stimuli and chooses the ones which seem the most rational to the individual. In the same way, through the interchange of ideas and through mental interstimulation and response between individuals, the social mind is evolved.

To this sort of social theory Professor Bernard objects. He says that the problem ahead of the sociologists "is to push further back the analysis of objective phenomena." He continues, "as psychology retreats from its introspective analysis of the

of the solipsistic self, and as ethics gives up mere intention as the criterion of morality, so sociology must turn from a subjective classification of social forces and study the functioning of objective social processes as they operate in individuals and groups."⁽¹⁾

He implies that one cannot know the content of other minds from the introspective study of his own mind. This is largely true, but if the content of a sufficient number of minds is studied, the general result will be that solipsism is avoided, and that the content of what may be termed "the social mind may be reached; and this can surely be made objective.

A new development of the introspective psychology which the more extreme behaviorists so strenuously object to, is to be found in the work of the Freudian school of psycho-analysis. This school, under the leadership of Sigmund Freud, has devoted itself to the interpretation of the mental phenomena of hysteria, the neurasthenic-neuropathic and allied states. By means of a method termed "psycho-analysis", the hidden origin of various phobias and other obscure mental states is unraveled; painful and long repressed memories are given free vent, and the patient cured. The Freudians have unfortunately been obsessed by the single factor of sex. They consider

(1). L. L. Bernard: The Transition to an Objective Standard of Social Control, Chicago, 1911, p. 75.

that every symptom, every phobia, delusion, impulse or obsession, has its origin in the repressed memory of some sexual experience, or in some sexual trauma received in childhood. Every dream, according to them, has a sexual origin, a sexual content, and a sexual significance. Thus Freud considers that dreams constitute a powerful factor in the production of mental symptoms.⁽¹⁾

Freud concludes that the lapses of memory are the result of a mental action which he terms "repression" (Verdrangung); and as the motive of this repression he recognizes feelings of aversion or dislike. That the psychic forces have brought about this repression, he recognizes in the resistance which is offered to the memory reproduction. The factor of this resistance has become one of the fundamental features of his theory. He regards that the ideas which under these circumstances are derivatives of the suppressed psychic pictures; are transformations of the same, the direct result of the resistance offered to their reproduction. The greater the resistance, the greater is this transformation. It is in this relation of these undesigned ideas to the suppressed memory that there is found the therapeutic indication of Freud's

(1). Freud's original work is entitled "Traumdeutung". The English translation by A. A. Brill is entitled "The Interpretation of Dreams", N. Y., 1913.

method. If we possess, he adds, a method which renders it possible to gain access from the involuntary ideas to the suppressed ones, from the transformation to the original ideas, we make previously undiscovered subconscious factors accessible to consciousness.⁽¹⁾

Freud further believes that in the study of dreams we have a method of access to repressed memories. He regards the dream-content as a compound of a number of psychic elements. He compares it to the composite family photographs of Galton. To the process of condensation are due the collective and mixed conceptions of persons and the strange mixed pictures, creations, and animal combinations which dreams so often present. Every element of a dream is the representative of much disparate material. Again, the apparent dream content and the latest dream-content differ from each other. During the process of eliciting the latter; i. e., the material obtained by the unrestrained association of ideas ensuing on giving one's self up to dwelling on the dream, the mind passes from the thoughts and conceptions to which it by right belongs to others which have no claim to such an emphasis or importance. It is this process which has

(1). The summary of Freud's views which is here presented is largely taken from E. B. Holt, "The Freudian Wish", N. Y., 1915; and W. A. White, "Mechanisms of Character Formation: An Introduction to Psychoanalysis", N. Y., 1916.

to do with the concealment of the meaning of the dream and with making it intelligible. This process, to which Freud ascribes great importance, he terms "dream displacement" (Traumverschiebung). The essential condition of this displacement is purely psychological. It is of the nature of a play of motives or activation. We ascertain the cause of this activation of motives when we realize that we are compelled to break off in communicating the contents of a dream because thoughts present themselves which cannot be revealed - cannot be spoken of to others - without the injury of considerations of a personal or private character. Freud asserts that this is true of the content of every dream, that every dream contains thoughts which necessitate privacy. If the individual investigates the dream-thought for himself, he arrives finally at thoughts which surprise him, which he did not know existed in him, and which appear strange and unpleasant. For this reason these thoughts must be resisted. Freud says that he cannot do otherwise than to suppose that these thoughts are really present in his soul-life (his sub-consciousness), and possess a certain psychic intensity or energy, but because they have been in a peculiar psychologic situation, they could not be known to him - could not reach his consciousness. He terms this condition "repres-

sion" (Verdrangung). He says that he cannot refrain from concluding that between the obscurity of the dream content and the condition of repression there is a causal relationship. Therefore, he regards that dreams have to be obscure in order that the tabooed dream-thoughts might not reveal themselves. The misrepresentation of the dream serves to conceal the latter.

Freud believes that the "dream-work" (Traumarbeit), is one of a series of psychic processes to which the origin of hysteria symptoms, phobias, obsessions, and delusions are to be ascribed. Condensation and especially displacement are characters never lacking in the other processes as well. Freud believes that a whole train of phenomena of the every-day life of normal individuals, such as forgetfulness, unconscious mistakes in speech, in simple acts and other errors, are due to analogous psychic mechanisms. (1) He regards that even in the deepest sleep a certain degree of psychic activity is present which manifests itself as a sort of watchfulness or guardianship over the sleeper. This guardian-like attention or watchfulness concerns itself, among other things, with a suppressed desire, and forms with the latter the dream, which is a compromise of this watchfulness

(1). Sigmund Freud: Psychopathology of the Everyday Life, Tr. by Brill, N. Y., 1914.

and the suppressed desire. Thus a kind of psychic relief is produced for the suppressed wish, for the dream represents the wish as fulfilled.

Freud has restricted these occurrences to purely sexual happenings, the so-called sexual traumata; and believes that the symptoms have their origin in some sexual action or aggression which may have happened in childhood. In taking this position he unquestionably goes too far; but, as he says, "the manifold sexual currents play no insignificant part in these repressed feelings."⁽¹⁾ It must be admitted that the sexual impulses play no little part, especially in mental conflicts which disturb the normal thought-current of the individual. The sex impulse or instinct surely plays a large part in the mental life of the abnormal individual, and some little part in the life of the normal individual as well.⁽¹⁾ This surely cannot be reduced to environmental factors.

Furthermore, Freud has shown through his psycho-analytic method that hidden and obscure mental states are repressed in the conscious state, and seek to find expression in the subconscious state in the form of dreams, and the like. His evidence has clearly demonstrated that "consciousness" is not a non-entity; but

(1). Ibid, p.333.

(2). Cf. Thomas, Sex and Society, Chicago, 1907.

that, on the other hand, it does exist and is very real and personal. If conscious processes are repressed through the operation of psychic processes which dictate this repression on the basis of feelings of aversion and dislike, then surely there must be centrally initiated nervous processes which control this resistance to memory reproduction. When the individual is asleep, in other words, is no longer conscious, the mind; i.e., the associational areas which control thinking, is no longer active and has to manifest itself in the sub-conscious processes. The painful and unpleasant memories, which one in his conscious state would repress can no longer be repressed because of the inactivity of these "centrally initiated nervous processes, and must manifest themselves in the form of dreams and the like. This evidence seems to clearly establish the fact of centrally initiated nervous processes in which the mind functions as the controlling agent in the determination of behavior. The anatomical and pathological evidence which has been offered seems to prove the case; at any rate the contrary, as yet, has not been demonstrable. So, on the whole, we believe that we are justified in forming at least an inconclusive conclusion that centrally initiated nervous processes are highly probable - a position that may be regarded as tenable until the

the contrary has been proved by the weight of sufficient evidence.

Thus the necessity of including the psychic factors in any adequate theory of the social forces is at once apparent. The part which the mind, and the psychic processes which proceed from the activities of the mind, play in the behavior of man is unquestionably important, and cannot be scientifically stated in terms of the environment. Such a view does not necessarily discount the importance of the environmental factors - economic or geographical; but it does insist that these latter factors do not play the whole part in the determination of man's social actions. The biological factors serve merely to give the individual the native equipment with which he begins life; the environmental factors function in their influence upon him; but the psychical forces function as selective agents in the molding of plastic hereditary structure, and the controlling of environmental stimuli. Furthermore, it is largely through the operation of these psychical forces that social life is made possible. Through mental interstimulation and response, functioning through articulate speech, language, customs, traditions, invention and discovery, mankind learns to live in groups, in societies. Thus

these psychical factors function in the evolution of culture, which becomes essentially a "learning process".

CHAPTER V

APPLICATION AND CONCLUSION

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Let us now see how these different sets of factors function in the evolution of culture or civilization. It is held by many sociologists that custom and tradition play one of the most important parts in this evolution of culture, as other factors function largely through them. Various theories have been proposed but only a few of them need to be noticed here.

The late Professor Sumner of Yale proposed the doctrine of "the folkways".⁽¹⁾ He held that men begin with acts rather than thoughts, that need was the impelling force, and sensations of pleasure and pain largely determined the course to be followed. This would go on not only in individuals, but also in groups. Thus habit, routine and skill were developed. Ways of doing things that were expedient would come to be selected, each new generation profiting by the experience of the past until all at last would come to have the same way of doing things, which in time would become "custom". As time went on, in-

(1). Folkways, N. Y., 1907.

instincts were developed in connection with these "customs", and thus "folkways" arise. When the group became convinced that these "customs" were essential to group welfare, then the folkways became converted into "mores". Sumner defines the "mores" as "the ways of doing things which are current in a society to satisfy human needs and desires, together with the faiths, notions, codes and standards of well-living which inhere in those ways, having a genetic connection with them."⁽¹⁾

Professor Keller attempted to reconstruct his predecessor's theory of the "folkways" in the light of Darwinian evolution. He holds that civilization in the aspect of its power over nature is really adaptation and not mastery. He regards man as only partially free, because he is largely bound by custom and convention. Especially is this true among savage tribes where custom and taboo determine just what each new generation must be. Professor Keller says: "Convention penetrates where statutes are not; and enacted laws are no more than the crystallization of certain of the more tangible manifestations of civilization. If we wish to get down to fundamentals and so arrive at the hidden springs of societal life and

(1). Ibid, p. 59.

evolution, we must seek them in the societal conventions and in public opinion."⁽¹⁾

Professor Keller considers that human evolution is bound up with the evolution of culture or civilization; i.e., social evolution is bound up in cultural evolution. The development of the culture attained depends upon the amount of adaptation which the individual or the group can make. Here, Keller makes the mistake of confusing social and cultural evolution; since social evolution is the evolution of communities and their organization, while cultural evolution is the attainment of culture or civilization. We are not concerned here with social evolution, but primarily with cultural evolution. This is not to be found in the animal groups below man; but it is the distinguishing feature of human social groups. All possess it, although in varying degrees and quantity; and there has never been a time in the history of human groups but what some degree of culture has been present. Culture has slowly evolved, and indeed must have proceeded from very simple beginnings to the more complex aspects of it which we now find among civilized mankind. During the long period within which culture has been slowly evolving certain factors have unquestionably

(1). A. G. Keller: Societal Evolution, N. Y., 1915, p. 30.

played a large part. Can it be that any group of factors or forces has played the sole part? Let us see.

We will first examine the environmental theory of culture, which insists that the influence of the environment, economic and geographical, has played the determining part. This theory as Dr. Lowie sarcastically suggests, bears a resemblance to the old classical associationist theory which so long prevailed in psychology. (1) According to this theory the mind was regarded as a sheet of blank paper on which the outer world produces impressions; and, accordingly, all of the higher mental activities, in the last analysis, are reducible to combinations of sense impressions. This theory has been given up in psychology for the most part, but seems to suggest the viewpoint of the environmentalist. As we have seen, the environment almost wholly controls the life of organisms below man; but then no sub-human group can be said to possess culture. Although foundations are there, yet individual and social evolution has not gone far enough to actually produce it. As Professor Ellwood has said, "the wonders of a hive of bees, or of a hill of ants, are truly 'social', i.e., they involve psychic interstimulation and response, but they are not cultur-

(1). Robert H. Lowie: Culture and Ethnology, N. Y., 1917, p.47.

(1)
al." The organization found in such animal communities has been wholly produced by the biological factors of heredity, variation and selection, together with some degree of habituation. The necessity for defense, nutrition and reproduction rigidly determines their entire life cycle. These, together with the selective action of the environment, are the only factors that need to be taken into account; for a rigid biological and geographical determinism completely covers their entire social life. Such a description cannot be at all adequate in accounting for the social life of man, (as was pointed out in chapter two). The acquired complex activities of man cannot be reduced to either environmental or biological factors.

As Dr. Lowie has pointed out, "the utilization of part of the environment, instead of being an automatic response has for an indispensable prerequisite a certain type of culture."⁽²⁾ As an illustration of this he states that the Navajo and Hopi Indians have for a long time both occupied the same section of Arizona; and, if the environmental theory were true,

(1). From an article entitled: "Theories of Cultural Evolution", unpublished at the time the above was written. Acknowledgement is here made for the free use which the writer has made of it.

(2). op. cit., pp. 48-49.

we would naturally expect to find among them the same sort of culture, but we do not. The Hopi Indians are agriculturalists and dwell in stone houses; while the Navajo do but little farming and live in conical-shaped, earth-covered huts. In short, parallels between peoples are not due to environmental stimuli, but, on the other hand, are due to contact and borrowing. To quote Dr. Lowie again: "Environment cannot explain culture because the identical environment is consistent with distinct cultures; because cultural traits persist from inertia in an unfavorable environment; because they do not develop where they would be of distinct advantage to a people; and because they may even disappear where one would least expect it on geographical principles." (1) The environment must be regarded as entering into culture, not as a formative element which predominates, but rather as an inert and plastic element to be selected from and molded at convenience.

The environmental theory disregards that man is differentiated from the lower animals by his adaptive brain, his power of articulate speech, language and invention. Because of these things human association is essentially different from animal association. Thus man is not merely an animal among other

(1). Ibid, p. 62.

animals, with a greater capacity for habituation; but his mental equipment has made it possible for him to adapt himself to his environment, and to more or less control it. ⁽¹⁾ Since man alone is capable of adjusting himself to even unfavorable environments through his powers of invention and the like; the explanation and interpretation of his culture is not to be found in an environmental theory. To quote from Dr. Lowie again: "Culture can no more be built up of environmental blocks than can consciousness out of isolated ideas." ⁽²⁾ It is not to be denied that the environment does furnish part of the material which must be used in building and constructing a culture. It does largely shape and mold the technology of a people; it enters into, colors and influences habituation, and the like; but it does not, in the broad sense of the term, explain culture. As Dr. Lowie says: "The environment furnishes the builders of cultural structures with brick and mortar but it does not furnish the architect's plan." ⁽³⁾

To what extent may the biological factors account for culture? Since culture is to be regarded as a complex of socially acquired traits, it would seem that racial or hereditary structures could not possi-

(1). See Ellwood: *Theories of Cultural Evolution*.

(2). Lowie: *op. cit.*, p. 65.

(3). *Ibid*, p. 64.

bly have any place in the determination of culture. But this is not wholly true. Hereditary characteristics have been largely brought about by organic and social evolution, and it may be possible that certain races possess more capacity for cultural acquisitions than do others. The principle of acquisition, however, is the same in all cases; for, as Clark Wissler says, "we fail to discover any essential differences in the tools of early man and those now made in a rationalistic manner; hence we can do no more than assume that (1) from the first they were inventions." Some races would likely prove more capable of invention than others, at least that is the way it has actually worked out in civilization. The white race is biologically better fitted for acquiring new activities than is the negro race, and to that extent race is to be regarded as a factor in the acquisition of culture. Primitive man made his inventions in the same manner as does modern man, and this makes it appear rather certain that race does not count as a dominating factor. As Dr. Lowie says, "the supposed explanation by racial potentialities would be far too general to interpret the actual (2) happenings."

(1). Clark Wissler: Psychological and Historical Interpretations for Culture, Science, Vol. XLIII, No. 1102, p. 195.

(2). Op. cit., p. 46.

Neither can the psychological factors of themselves wholly account for culture. Psychology, even in excursions into the abnormal, or in its introspective study of individual variations, does not fully grapple with acquired mental traits and with the influence of society as a whole on individual thought, will and feeling. Psychology, it is true can give us helpful explanations, but in itself alone, cannot account for the whole phenomena of culture. The psychological factors which issue from psychology are thus inadequate in giving full and systematic explanations of culture. As an illustration of the inadequacy of the psychological explanation we can take the transmission of the art of paper manufacture. It was invented by the Chinese, borrowed from them by the Arabs, and transmitted through the Arabs to the Europeans. Why did not the Europeans borrow it directly from the Chinese? It was because the Europeans had no knowledge of the invention of paper until they had it communicated to them by the Arabs. They did not have direct contact with the Chinese, and, therefore, could not become acquainted with the art until they became familiar with it through their contact with the Arabs. (1) Geographical isolation prevented the direct transmission. Geographical isolation, however, cannot always account for the transmission of culture; i.e., the Hopi Indians of Arizona

(1). Cf. Lowie, *ibid*, p. 10.

had no knowledge of the industrial culture of another tribe living only eight miles away.

Psychology cannot fully explain the borrowing and the transmission of culture because it deals principally with the innate traits of the individual. Again, such psychic factors as language, tradition and the "mores", while they do account for a great deal of the transmission of culture, cannot account for the whole phenomena. The cultural phenomena, even when considered in their psychological aspect, comprises something over and above the facts which psychology can explain. As Dr. Lowie says: "The cultural facts, even in their subjective aspect, are not merged in psychological facts. They must not, indeed, contravene psychological principles, but the same applies to all other principles of the universe; culture cannot construct houses contrary to the laws of gravitation nor produce bread out of stones. But the principles of psychology are as incapable of accounting for the phenomena of culture as is gravitation to account for architectural styles. Over and above the interpretation given by psychology, there is an irreducible residuum of huge magnitude that calls for special treatment and by its very existence vindicates the ⁽¹⁾raison d'etre of ethnology." This does not mean that the psychical factors are to be disregarded, but only

(1). Ibid, pp. 25-26.

that they alone cannot account for culture. It may be that they are the dominating set of factors, but they are not the sole factors.

Now let us see if our synthetic theory can account for cultural phenomena, which Wissler says is to be conceived of "as including all of the activities of man acquired by learning", and which he defines as "the acquired activity complexes of human groups."⁽¹⁾ The problem involved resolves itself into the almost identical education problem of inborn versus acquired activities. This problem has been systematically discussed by Professor Thorndike in his "Original Nature of Man". He tells us that "a child instinctively conveys food to his mouth with the naked hand, but by habit comes to use a spoon."⁽²⁾ The use of a spoon in eating is surely a cultural fact in contrast to the use of the hand. It is thus analogous to the use of tools in general, which loom so large in the objective phenomena of culture. Not all instincts found in original human nature are to be regarded as cultural facts, as Thorndike admits. He seems to conclude that while original nature often demands that an individual respond in a certain way to certain stimuli; yet it does not always dominate the character and frequency

(1). Clark Wissler: op. cit., p. 195.

(2). E. L. Thorndike: Original Nature of Man, p. 3.

of response. The individual is endowed at birth with only a few hereditarily-determined instinctive possibilities; many of the instinctive responses must be acquired. To quote Wissler again: "While all culture is acquired, there must still be a complex of instincts to acquire and participate in cultural activities; but only very rarely, if at all, specific instincts for the acquisition of a particular culture."⁽¹⁾

Culture is in content fundamentally ideational; i.e., is largely made possible through ideas and the connections between them. This is not found in original human nature, as Thorndike points out. He says that: "No one has, I think, found satisfactory evidence that, apart from training, an idea leads of inner necessity to any one response..... We have, of course, by original nature the capacities to connect the idea of one thing to the idea of another thing when the two have been in certain relations, and to break up the idea of a total fact into ideas of its elements, when once ideas have been given that are capable of such association and analysis. But we do not apparently, by original nature, have preformed bonds leading from ideas to anything. If an idea apart from training provokes a response, it does so by virtue of its likeness to some sensory perception or emotion. Nor do we apparently

(1). Op. cit., p. 196.

by original nature respond to a situation by any one idea rather than another. That we think is due to original capacity to associate and analyze, but what we think is due to the environmental conditions under which
(1)
these capacities work."

Man has, as we have noted, an inborn capacity for tool-making. Indeed, it may be said that man is by original nature both a tool-using and a tool-wanting animal. Some anthropologists hold to the psychic-accident theory, that man discovered the use of tools by accident, and that his innate instinct for tools made it possible for him to seize upon this discovery and utilize it for the benefit of the group. But it is much more likely that some especially gifted individual discovered a new way of doing things in a rational manner; i.e., through the medium of the trial and error method. Thus this invention, or the production of the new traits of culture, must itself be rationalized, as is the case when we deliberately set ourselves an inventive task, or even when we recognize the inventive process as a method of culture production. New conceptions must come as the normal, undirected activity of thought. Hence the power of rationalization must also have been a part of man's original nature. It has been shown by anthropologists that

(1). Thorndike: op. cit., p. 24.

many forms of stone tools are but slight modifications of selected pebbles, whose natural shapes were adapted to the specific purpose for which tools were sought. Let us take for example-the making of a flaked stone implement. When once formed this new implement would serve as a "pattern" for the other members of the group. By and by another gifted individual would improve upon this former implement, and he in turn would communicate his invention to the group, who would use it as a "pattern" for their use. Thus culture must have been in its origin a matter of ideas in which the rationali-
 (1)
 zing mechanism functions. The first requisite for such a process would be the appearance of an anthropoid possessing this rationalizing element as part of his original nature. As Wissler says: "The forms and varieties of cultural remains seem to necessitate from the first the existence of this rationalizing power at its present level..... Anthropologists favor the view that no mechanical movement complexes for tool-making are innate, but that there is in man's original nature a mechanism that lays hold of things and thus supplies the basis for self-rationalization (the ratiocination process) and for the acquisition of the great store of accumulated rationalizations of the
 (2)
 race, or culture."

(1). Cf. Ellwood: Theories of Cultural Evolution.

(2). Op. cit., p. 200.

Culture is to be explained in terms of itself - "omnia cultura ex cultura". Thus a cultural fact is to be accounted for by merging it in a group of cultural facts, or by demonstrating some other cultural fact out of which it has developed. Culture, as we have seen, is largely the result of invention and is made possible by the ratiocination process. What are the determinants of culture? They come about largely through the diffusion and contact of peoples. As Gudmund Hatt says: "It is and has always been much easier to borrow an idea from one's neighbors than to originate a new idea; and transmission of cultural elements, which in all ages has taken place in a great many different ways, is and always has been one of the greatest promoters of cultural development."⁽¹⁾ This is illustrated by the success the Japanese have attained in the taking over of Occidental civilization. Again, the first colonists in America took over the maize culture in its entirety without any modifications whatever. Transmission has also followed the trade routes. Etruscan vases have been found all of the way from the Baltic to the mainland of Asia, but principally along the ancient trade routes of the Danube Valley. Again, amber beads have been found not only in Swiss pile-dwellings, but also in Mycenaean ruins of the second

(1). Moccasins and their Relation to Arctic Foot-wear. Memoirs, Amer. Anthro. Assn., Vol. III, No. 3, p. 246.

millenium B. C. The Bronze culture which originated around the Mediterranean basin found its way northward and was the principal agent in transforming the Scandinavians of the far north of Europe from a state of savagery to one of enlightened civilization. The contact of peoples in the old world made civilization possible, as one people would borrow from another, and various cultural technology and institutions were thus diffused. Since the agricultural technology, pastoral industry, and pottery of both the Chinese and Babylonians are somewhat analogous, anthropologists are led to believe that both cultures are ramifications from a common Asiatic sub-stratum.⁽¹⁾

The contact of peoples has led to a free exchange of arts and ideas, and has succeeded in making their culture similar. But before peoples can communicate their culture, they must first evolve it. This comes about through the attainment of a complex of acquired activities. One generation learns from the one preceding it, and from other peoples. Culture thus becomes a "learning process". It is transmitted through heredity (race), the influences of the economic and geographical environment, and the psychical factors of language, invention and tradition. Each new generation

(1). Robert H. Lowie: Culture and Ethnology, p. 76.

is born with the innate capacity for taking on culture, but as it is an acquisition of acquired activity complexes, its attainment is essentially a "learning process". Thus all of these factors cooperate in making culture possible. No one set of factors is capable of accounting for the whole phenomena, but all taken together form a synthetic whole which explains culture in its entirety. These factors are social forces, which in their interplay upon human groups have wrought the fabric of culture or civilization. Instinctively man was a tool-making and a tool-using animal, with an innate capacity for invention. Invention, through which man has controlled the forces of the environment and harnessed them to his use, made industry possible, and upon industry has been reared the whole structure of civilization. Articulate speech and language must have been coeval with the evolution of technology. Through language and the contact of peoples, knowledge and skill were transmitted, and have brought about the birth of science, art, morality, religion, government - in brief, all of the human achievements and institutions which make up the substance and content of culture.

In thus reducing the origin and development of culture to "a learning process", through the acquisition of acquired activity complexes, we can easily see

how these would tend to become "mores", and be handed down from generation to generation. This brings us a little closer to the starting point of both Sumner and Keller, but our statement is perhaps more definite. Thus the connection existing between the "mores" and "culture" is at once apparent. The principles involved in the evolution of culture are variation, selection, transmission and adaptation.

If there were no variations in the "mores" there would be little or no diversity in human customs and institutions. As we study existing society we at once see that no two groups, families, fraternities, religious sects, or political units have the same set of "mores". But according to our theory of the development of culture as a learning process there is ample room for diversity in the mores. In other words, the development of culture proceeds independently, at least to some extent. The mores of a people are affected by their environment and their heredity, which account for some of the variation which we find.

As men acquired new habits through new inventions, there came to be selection from among the mores; and this selection tended to limit the variation of the mores. There would come to be a certain amount of uniformity in the practice of certain mores, through the following of certain "pattern ideas", and finally

those mores which were deemed essential to group welfare would come to receive social and religious sanction, and would become the "mores" of the group. The place which religious approval has held in the formation of the mores of a group has indeed been great. It has perhaps been the greatest factor of all, because when religious sanction attaches itself to a custom it continues even after it has outlived its usefulness to the group. Some of this selection has gone on automatically as determined largely by environmental and racial factors. But final selection has proceeded rationally. Rational selection has depended upon the fitness, or unfitness, the rightness, or wrongness of the mores when considered for the benefit of the whole group. Thus selection has come about through the ratiocination process.

Transmission has come about through the interplay of various forces, such as heredity, speech, language, tradition, education, imitation, etc. In the past cultures have been largely interwoven; and indeed, there is not a single culture anywhere that has not been affected to some extent by other cultures. The Chinese are seemingly an exception; but if the view of modern anthropology is correct the Chinese came into China about 4,000 years ago from the steppes of Asia, where they had come into contact with the Babylonian

and Egyptian cultures, and had acquired some of the mores of these groups. In seclusion the Chinese invented gunpowder, the printing press and the compass; but they used them merely as toys, and did not put them to practical use, especially using the compass as children would - to guide them about the streets, totally failing to use it for its main use - namely, navigation. Through war-like raids and invasions, one culture was transmitted and fused with another. In many cases the conquering group became the ruling class and took up some of the mores of the conquered group, substituting some of their own, and imposing them upon the conquered peoples.

Adaptation represents the final selection after variation and transmission have gone on indefinitely. Through a more or less flexible adaptation institutions may be transplanted from one people to another, and modified to fit the new need. A striking illustration of this adaptation is seen in the institutions of our own country. For instance, we have borrowed ethics and religion from the Hebrews; philosophy, art and education from the Greeks; government and law from the Romans; and the doctrine of individual liberty from the Teutons.

Thus in its final outcome culture is essentially "a learning process", which is made possible because there exists in the original nature of man a mechanism

that makes rational thinking and rational adaptation possible. Thus man is capable of acquiring the great store of accumulated knowledge of the race, - all of those things which make up the substance and sum total of human achievement. It is a learning process in which no one set of social forces functions to the exclusion of the others; but all are combined and synthetized in the attainment of the final goal - civilization. The environmental and biological forces, reacted upon and utilized by the psychical forces, and the whole guided and in large measure controlled by human reason have wrought the warp and woof of civilization.

SUMMARY

In summarizing our theory of the social forces, we must necessarily form some certain definite conclusions. The social forces are not one but many. No monistic theory of the social forces can stand because unscientific and inadequate. Similarly the stressing of a single group of forces is also inadequate because it fails to take into consideration the whole phenomena of culture. Metaphysical dogma has no place in the statement of an adequate theory of the social forces; because, as we have seen, true science has no room for metaphysical dogma and specula-

tion. A scientific statement of the social forces necessarily gives each set of factors its proper place, but does not dogmatically assert that these factors are in themselves sufficient to account for social phenomena. A thorough-going objectivism is also undesirable because social phenomena are as yet so little understood that to describe the social behavior of mankind in terms of stimuli and response would only serve to cloud and obscure the issue.

The environmental forces which are primarily the effect upon the organism of the geographical and economic environment, while they practically account for all of the activities of the lower organisms, cannot account for all of the complex social activities of man. They play an important part to be sure, but not the whole part, in the social behavior of human individuals and human society.

The biological factors of heredity, variation and selection can only give the human organism the equipment with which it begins life; they do not determine the future career of either the individual or the group. Any adequate theory of heredity must be a combination of Mendelian heredity and Weismann's theory of the germ-plasm. It must, accordingly, regard mankind as being equipped with certain hereditarily determined instinctive adjustments which can be modi-

fied after birth, but the biological factors cannot be regarded as the dominant factors in social life.

The psychical factors play an important part in the individual and social life of mankind. The habits, feelings, and intellectual elements are not reducible to either environmental or biological forces. On the other hand, they probably play a more or less dominant role in the determining of social relationship among civilized human beings. The part played by centrally initiated nervous processes seems to indicate that the intellect or reason plays the dominant part in the determining of the social life of both the individual and the group. Consciousness is not a non-entity, as some have urged, but is very much a fact, as the Freudian psycho-analysis has demonstrated. On the whole the psychical factors must continue to occupy a very important place in any adequate statement of the social forces.

The psychical factors, or forces, as we have seen in our examination of the evolution of culture, are not to be emphasized to the exclusion of other forces. All of these different sets of forces, environmental, biological, and psychical must be combined into a synthetic whole, if an adequate and scientific theory of the social forces is to be obtained. In the evolution of culture, which we viewed as essen-

tially "a learning process" made possible through the acquisition of acquired activity complexes, all of these different sets of forces must function. Any dogmatic or metaphysical assumptions which seek to reduce the social forces to any one factor or group of factors are thus to be regarded as both unsound and unscientific. A theory which includes them all and synthesizes the whole is, therefore, to be regarded as a sound theory of the social forces, and must, accordingly, form "the cornerstone of sociology".

THE END

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