



## The Aims of Anthropological Research

Franz Boas

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## THE AIMS OF ANTHROPOLOGICAL RESEARCH<sup>1</sup>

By Dr. FRANZ BOAS

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THE science of anthropology has grown up from many distinct beginnings. At an early time men were interested in foreign countries and in the lives of their inhabitants. Herodotus reported to the Greeks what he had seen in many lands. Caesar and Tacitus wrote on the customs of the Gauls and Germans. In the Middle Ages Marco Polo, the Venetian, and Ibn Batuta, the Arab, told of the strange people of the Far East and of Africa. Later on, Cook's Journeys excited the interest of the world. From these reports arose gradually a desire to find a general significance in the multifarious ways of living of strange people. In the eighteenth century Rousseau, Schiller and Herder tried to form, out of the reports of travelers, a picture of the history of mankind. More solid attempts were made about the middle of the nineteenth

<sup>1</sup> Address of the president of the American Association for the Advancement of Science, Atlantic City, December, 1932.

century, when the comprehensive works of Klemm and Waitz were written.

Biologists directed their studies towards an understanding of the varieties of human forms. Linnaeus, Blumenbach, Camper are a few of the names that stand out as early investigators of these problems, which received an entirely new stimulus when Darwin's views of the instability of species were accepted by the scientific world. The problem of man's origin and his place in the animal kingdom became the prime subject of interest. Darwin, Huxley and Haeckel are outstanding names representing this period. Still more recently the intensive study of heredity and mutation has given a new aspect to inquiries into the origin and meaning of race.

The development of psychology led to new problems presented by the diversity of the racial and social groups of mankind. The question of mental charac-

teristics of races, which at an earlier period had become a subject of discussion with entirely inadequate methods—largely stimulated by the desire to justify slavery—was taken up again with the more refined technique of experimental psychology, and particular attention is now being paid to the mental status of primitive man and of mental life under pathological conditions. The methods of comparative psychology are not confined to man alone, and much light may be thrown on human behavior by the study of animals. The attempt is being made to develop a genetic psychology.

Finally sociology, economics, political science, history and philosophy have found it worth while to study conditions found among alien people in order to throw light upon our modern social processes.

With this bewildering variety of approaches, all dealing with racial and cultural forms, it seems necessary to formulate clearly what the objects are that we try to attain by the study of mankind.

We may perhaps best define our objective as the attempt to understand the steps by which man has come to be what he is, biologically, psychologically and culturally. Thus it appears at once that our material must necessarily be historical material, historical in the widest sense of the term. It must include the history of the development of the bodily form of man, his physiological functions, mind and culture. We need a knowledge of the chronological succession of forms and an insight into the conditions under which changes occur. Without such data progress seems impossible and the fundamental question arises as to how such data can be obtained.

Ever since Lamarck's and Darwin's time the biologist has been struggling with this problem. The complete paleontological record of the development of plant and animal forms is not available. Even in favorable cases gaps remain that can not be filled on account of the lack of intermediate forms. For this reason indirect proofs must be resorted to. These are based partly on similarities revealed by morphology and interpreted as proof of genetic relationship, partly on morphological traits observed in prenatal life, which suggest relationship between forms that as adults appear quite distinct.

Caution in the use of morphological similarities is required, because there are cases in which similar forms develop in genetically unrelated groups, as in the marsupials of Australia, which show remarkable parallelism with higher mammal forms, or in the white-haired forms of the Arctic and of high altitudes, which occur independently in many genera and species, or in the blondness and other abnormal hair forms of domesticated mammals which develop regardless of their genetic relations.

As long as the paleontological record is incomplete we have no way of reconstructing the history of animals and plants except through morphology and embryology.

This is equally true of man, and for this reason the eager search for early human and prehuman forms is justified. The finds of the remains of the *Pithecanthropus* in Java, the *Sinanthropus* in China, of the Heidelberg jaw and of the later types of the glacial period are so many steps advancing our knowledge. It requires the labors of the enthusiastic explorer to furnish us with the material that must be interpreted by careful morphological study. The material available at the present time is sadly fragmentary. It is encouraging to see that it is richest in all those countries in which the interest in the paleontology of man has been keenest, so that we may hope that with the increase of interest in new fields the material on which to build the evolutionary history of man will be considerably increased.

It is natural that with our more extended knowledge of the evolutionary history of the higher mammals certain points stand out that will direct the labors of the explorer. Thus on the basis of our knowledge of the distribution of ape forms, nobody would search for the ancestors of humanity in the New World, although the question when the earliest migration of man into America took place is still one of the problems that is prominent in researches on the paleontology of the glacial period of America.

The skeletal material of later periods is more abundant. Still it is difficult to establish definitely the relation of early skeletal remains and of modern races, because many of their most characteristic traits are found in the soft parts of the body that have not been preserved. Furthermore, the transitions from one race to another are so gradual that only extreme forms can be determined with any degree of definiteness.

On account of the absence of material elucidating the history of modern races, it is not surprising that for many years anthropologists have endeavored to classify races, basing their attempts on a variety of traits, and that only too often the results of these classifications have been assumed as expressions of genetic relationship, while actually they have no more than a descriptive value, unless their genetic significance can be established. If the same metric proportions of the head recur in all races they can not be a significant criterion of fundamental racial types, although they may be valuable indications of the development of local strains within a racial group. If, on the other hand, a particular hair form is a trait well-nigh universal in extensive groups of mankind, and one that does not recur in other groups, it

will in all probability represent an ancient hereditary racial trait, the more so, if it occurs in a geographically continuous area. It is the task of the anthropologist to search out these outstanding traits and to remember that the exact measurement of features which are not exclusive racial characteristics will not answer the problems of the evolution of fundamental types, but can be taken only as an indication of independent, special modifications of late origin within the large racial groups.

From this point of view the general question of the occurrence of parallel development in genetically unrelated lines assumes particular importance. We have sufficient evidence to show that morphological form is subject to environmental influences that in some cases will have similar effects upon unrelated forms. Even the most skeptical would admit this for size of the body.

Changes due to environment that occur under our eyes, such as minute changes in size and proportion of the body, are probably not hereditary, but merely expressions of the reaction of the body to external conditions and subject to new adjustments under new conditions.

However, one series of changes, brought about by external conditions, are undoubtedly hereditary. I mean those developing in domestication. No matter whether they are due to survival of aberrant forms or directly conditioned by domestication, they are found in similar ways in all domesticated animals, and because man possesses all these characteristics he proves to be a domesticated form. Eduard Hahn was probably the first to point out that man lives like a domesticated animal; the morphological points were emphasized by Eugen Fischer, B. Klatt and myself.

The solution of the problem of the origin of races must rest not only on classificatory studies and on those of the development of parallel forms, but also on the consideration of the distribution of races, of early migrations and consequent intermingling or isolation.

On account of the occurrence of independent development of parallel forms it seems important to know the range of variant local forms that originate in each race, and it might seem plausible that races producing local variants of similar types are closely related. Thus Mongolids and Europeans occasionally produce similar forms in regions so wide apart that it would be difficult to interpret them as effects of intermingling.

The biological foundations of conclusions based on this type of evidence are, to a great extent, necessarily speculative. Scientific proof would require a knowledge of the earliest movements of mankind, an intimate acquaintance with the conditions under which

racial types may throw off variants and the character and extent of such variations.

The solution of these problems must extend beyond morphological description of the race as a whole. Since we are dealing to a great extent with forms determined by heredity, it seems indispensable to found the study of the race as a whole on that of the component genetic lines and of their variants, and on inquiries into the influence of environment and selection upon bodily form and function. The race must be studied not as a whole but in its genotypical lines as developing under varying conditions.

In the study of racial forms we are too much inclined to consider the importance of races according to the number of their representatives. This is obviously an error, for the important phenomenon is the occurrence of stable morphological types, not the number of individuals representing each. The numerical strength of races has changed enormously in historic times, and it would be quite erroneous to attribute an undue importance to the White race or to the East Asiatics, merely because they have outgrown in numbers all other racial types. Still, in descriptive classifications the local types of a large race are given undue prominence over the less striking subdivisions of lesser groups. As an example, I might mention Huxley's divisions of the White race as against his divisions of other races.

We are interested not only in the bodily form of races but equally in the functioning of the body, physiologically as well as mentally. The problems presented by this class of phenomena present particular difficulties on account of the adjustability of function to external demands, so that it is an exceedingly precarious task to distinguish between what is determined by the biological make-up of the body and what depends upon external conditions. Observations made on masses of individuals in different localities may be explained equally well by the assumption of hereditary racial characteristics and by that of changes due to environmental influences. A mere description of these phenomena will never lead to a result. Different types, areas, social strata and cultures prove to exhibit differences in physiological and mental function. A dogmatic assertion that racial type alone is responsible for these differences is a pseudo science. An adequate treatment requires a weighing of the diverse factors.

Investigators are easily misled by the fact that the hereditary, biologically determined endowment of an individual is intimately associated with the functioning of his body. This appears most clearly in cases of bodily deficiency or of unusually favorable bodily development. It is quite a different matter to extend this observation over whole populations or racial

groups in which are represented a great variety of hereditary lines and individuals, for the many forms of bodily make-up found in each group allows a great variety of functioning. Hereditary characteristics are pronounced in genetic lines, but a population—or to use the technical term, a phenotype—is not a genetic line and the great variety of genotypes within a race forbids the application of results obtained from a single hereditary line to a whole population in which the diversity of the constituent lines is bound to equalize the distribution of diverse genetic types in the populations considered. I have spoken so often on this subject that you will permit me to pass on to other questions.

While paleontological evidence may give us a clue to the evolution of human forms, only the most superficial evidence can be obtained for the development of function. A little may be inferred from size and form of the brain cavity and that of the jaw, in so far as it indicates the possibility of articulate speech. We may obtain some information on the development of erect posture, but the physiological processes that occurred in past generations are not accessible to observation. All the conclusions that we may arrive at are based on very indirect evidence.

The mental life of man also can be studied experimentally only among living races. It is, however, possible to infer some of its aspects by what past generations have done. Historical data permit us to study the culture of past times, in a few localities, as in the eastern Mediterranean area, India, China as far back as a few thousand years—and a limited amount of information on the mental life of man may be obtained from these data. We may even go farther back and extend our studies over the early remains of human activities. Objects of varied character, made by man and belonging to periods as early as the Quaternary, have been found in great quantities, and their study reveals at least certain aspects of what man has been able to do during these times.

The data of prehistoric archeology reveal with progress of time a decided branching out of human activities. While from earliest periods nothing remains but a few simple stone implements, we see an increasing differentiation of form of implements used by man. During the Quaternary the use of fire had been discovered, artistic work of high esthetic value had been achieved, and painted records of human activities had been made. Soon after the beginning of the recent geological period the beginnings of agriculture appear and the products of human labor take on new forms at a rapidly accelerating rate. While in early Quaternary times we do not observe any change for thousands of years, so that the observer might imagine that the products of human hands

were made according to an innate instinct, like the cells of a beehive, the rapidity of change becomes the greater the nearer we approach our time, and at an early period we recognize that the arts of man can not be instinctively determined, but are the cumulative result of experience.

It has often been claimed that the very primitiveness of human handiwork of early times proves organic mental inferiority. This argument is certainly not tenable, for we find in modern times isolated tribes living in a way that may very well be paralleled with early conditions. A comparison of the psychic life of these groups does not justify the belief that their industrial backwardness is due to a difference in the types of organism, for we find numbers of closely related races on the most diverse levels of cultural status. This is perhaps clearest in the Mongolid race, where by the side of the civilized Chinese are found the most primitive Siberian tribes, or in the American group, where the highly developed Maya of Yucatan and the Aztecs of Mexico may be compared with the primitive tribes of our western plateaus. Evidently historic and prehistoric data give us little or no information on the biological development of the human mind.

How little the biological, organic determinants of culture can be inferred from the state of culture appears clearly if we try to realize how different the judgment of racial ability would have been at various periods of history. When Egypt flourished, northern Europe was in primitive conditions, comparable to those of American Indians or African Negroes, and yet northern Europe of our day has far outdistanced those people, who at an earlier time were the leaders of mankind. An attempt to find biological reasons for these changes would necessitate innumerable unprovable hypotheses regarding changes of the biological make-up of these peoples, hypotheses that could be invented only for the purpose of sustaining an unproved assumption.

A safer mode of approaching the problems at issue would seem to lie in the application of experimental psychology which might enable us to determine the psychophysical and also some of the mental characteristics of various races. As in the case of biological inquiry it would be equally necessary in this study to examine genotypical lines rather than populations, because so many different lines are contained in the mass.

A serious difficulty is presented by the dependence of the results of any psychophysical or mental tests upon the experiences of the individual who is the subject of the tests. His experiences are largely determined by the culture in which he lives. I am of the opinion that no method can be devised by

which this all-important element is eliminated, but that we always obtain a result which is a mixed impression of culturally determined influences and of bodily build. For this reason I quite agree with those critical psychologists who acknowledge that for most mental phenomena we know only European psychology and no other.

In the few cases in which the influence of culture upon mental reaction of populations has been investigated it can be shown that culture is a much more important determinant than bodily build. I repeat, that in individuals a somewhat close relation between mental reaction and bodily build may be found, which is all but absent in populations. Under these circumstances it is necessary to base the investigation of the mental life of man upon a study of the origin and history of cultural forms and of the interrelations between individual mental life and culture.

This is the subject-matter of cultural anthropology. It is safe to say that the results of the extensive materials amassed during the last fifty years do not justify the assumption of any close relation between biological types and form of culture.

As in the realm of biology our inferences must be based on historical data, so it is in the investigation of cultures. Unless we know how the culture of each group of man came to be what it is, we can not expect to reach any conclusions in regard to the conditions controlling the general history of culture.

The material needed for the reconstruction of the biological history of mankind is insufficient on account of the paucity of remains and the disappearance of all soft, perishable parts. The material for the reconstruction of culture is ever so much more fragmentary because the largest and most important aspects of culture leave no trace in the soil; language, social organization, religion—in short, everything that is not material—vanishes with the life of each generation. Historical information is available only for the most recent phases of cultural life and is confined to those peoples who had the art of writing and whose records we can read. Even this information is insufficient because many aspects of culture find no expression in literature. Is it then necessary to resign ourselves and to consider the problem as insoluble?

In biology we supplement the fragmentary paleontological record with data obtained from comparative anatomy and embryology. Perhaps an analogous procedure may enable us to unravel some of the threads of cultural history.

There is one fundamental difference between biological and cultural data which makes it impossible to transfer the methods of the one science to the other. Animal forms develop in divergent directions, and an intermingling of species that have once become distinct

is negligible in the whole developmental history. It is otherwise in the domain of culture. Human thoughts, institutions, activities may spread from one social unit to another. As soon as two groups come into close contact their cultural traits will be disseminated from the one to the other.

Undoubtedly there are dynamic conditions that mould in similar forms certain aspects of the morphology of social units. Still we may expect that these will be overlaid by extraneous elements that have no organic relation to the dynamics of inner change.

This makes the reconstruction of cultural history easier than that of biological history, but it puts the most serious obstacles in the way of discovering the inner dynamic conditions of change. Before morphological comparison can be attempted the extraneous elements due to cultural diffusion must be eliminated.

When certain traits are diffused over a limited area and absent outside of it, it seems safe to assume that their distribution is due to diffusion. In some rare cases even the direction of diffusion may be determined. If Indian corn is derived from a Mexican wild form and is cultivated over the larger part of the two Americas we must conclude that its cultivation spread from Mexico north and south; if the ancestors of African cattle are not found in Africa, they must have been introduced into that continent. In the majority of cases it is impossible to determine with certainty the direction of diffusion. It would be an error to assume that a cultural trait had its original home in the area in which it is now most strongly developed. Christianity did not originate in Europe or America. The manufacture of iron did not originate in America or northern Europe. It was the same in early times. We may be certain that the use of milk did not originate in Africa, nor the cultivation of wheat in Europe.

For these reasons it is well-nigh impossible to base a chronology of the development of specific cultures on the observed phenomena of diffusion. In a few cases it seems justifiable to infer from the worldwide diffusion of a particular cultural achievement its great antiquity. This is true when we can prove by archeological evidence its early occurrence. Thus, fire was used by man in early Quaternary times. At that period man was already widely scattered over the world and we may infer that either the use of fire was carried along by him when he migrated to new regions or that it spread rapidly from tribe to tribe and soon became the property of mankind. This method can not be generalized, for we know of other inventions or ideas that spread with incredible rapidity

over vast areas. An example is the spread of tobacco over Africa, as soon as it was introduced on the coast.

In smaller areas attempts at chronological reconstruction are much more uncertain. From a cultural center in which complex forms have developed, elements may radiate and impress themselves upon neighboring tribes, or the more complex forms may develop on an old less differentiated basis. It is seldom possible to decide which one of these alternatives offers the correct interpretation.

Notwithstanding all these difficulties, the study of geographical distribution of cultural phenomena offers a means of determining their diffusion. The outstanding result of these studies has been the proof of the intricate interrelation of people of all parts of the world. Africa, Europe and the greater part of Asia appear to us as a cultural unit in which one area can not be entirely separated from the rest. America appears as another unit, but even the New World and the Old are not entirely independent of each other, for lines of contact have been discovered that connect northeastern Asia and America.

As in biological investigations the problem of parallel independent development of homologous forms obscures that of genetic relationship, so it is in cultural inquiry. If it is possible that analogous anatomical forms develop independently in genetically distinct lines, it is ever so much more probable that analogous cultural forms develop independently. It may be admitted that it is exceedingly difficult to give absolutely indisputable proof of the independent origin of analogous cultural data. Nevertheless, the distribution of isolated customs in regions far apart hardly admits of the argument that they were transmitted from tribe to tribe and lost in intervening territory. It is well known that in our civilization current scientific ideas give rise to independent and synchronous inventions. In an analogous way primitive social life contains elements that lead to somewhat similar forms in many parts of the world. Thus the dependence of the infant upon the mother necessitates at least a temporary difference in the mode of life of the sexes and makes woman less movable than man. The long dependence of children on their elders leaves also an inevitable impress upon social form. Just what these effects will be depends upon circumstances. Their fundamental cause will be the same in every case.

The number of individuals in a social unit, the necessity or undesirability of communal action for obtaining the necessary food supply give dynamic conditions that are active everywhere and that are germs from which analogous cultural behavior may spring.

Besides these, there are individual cases of inven-

tions or ideas in lands far apart that can not be proved to be historically connected. The fork was used in Fiji and invented comparatively recently in Europe: the spear, projected by a thong wound spirally about the shaft, was used on the Admiralty Islands and in ancient Rome. In some cases the difference in time makes the theory of a transfer all but unthinkable. This is the case, for instance, with the domestication of mammals in Peru, the invention of bronze in Peru and Yucatan and that of the zero in Yucatan.

Some anthropologists assume that, if a number of cultural phenomena agree in regions far apart, these must be due to the presence of an exceedingly ancient substratum that has been preserved notwithstanding all the cultural changes that have occurred. This view is not admissible without proof that the phenomena in question remain stable not only for thousands of years, but even so far back that they have been carried by wandering hordes from Asia to the extreme southern end of South America. Notwithstanding the great tenacity of cultural traits, there is no proof that such extreme conservatism ever existed. The apparent stability of primitive types of culture is due to our lack of historical perspective. They change much more slowly than our modern civilization, but wherever archeological evidence is available we do find changes in time and space. A careful investigation shows that those features that are assumed as almost absolutely stable are constantly undergoing changes. Some details may remain for a long time, but the general complex of culture can not be assumed to retain its character for a very long span of time. We see people who were agricultural become hunters, others change their mode of life in the opposite direction. People who had totemic organization give it up, while others take it over from their neighbors.

It is not a safe method to assume that all analogous cultural phenomena must be historically related. It is necessary to demand in every case proof of historical relation, which should be the more rigid the less evidence there is of actual recent or early contact.

In the attempt to reconstruct the history of modern races we are trying to discover the earlier forms preceding modern forms. An analogous attempt has been demanded of cultural history. To a limited extent it has succeeded. The history of inventions and the history of science show to us in course of time constant additions to the range of inventions, and a gradual increase of empirical knowledge. On this basis we might be inclined to look for a single line of development of culture, a thought that was preeminent in anthropological work of the end of the past century.

The fuller knowledge of to-day makes such a view

untenable. Cultures differ like so many species, perhaps genera, of animals, and their common basis is lost forever. It seems impossible, if we disregard invention and knowledge, the two elements just referred to, to bring cultures into any kind of continuous series. Sometimes we find simple, sometimes complex, social organizations associated with crude inventions and knowledge. Moral behavior, except in so far as it is checked by increased understanding of social needs, does not seem to fall into any order.

It is evident that certain social conditions are incompatible. A hunting people, in which every family requires an extended territory to insure the needed food supply, can not form large communities, although it may have intricate rules governing marriage. Life that requires constant moving about on foot is incompatible with the development of a large amount of personal property. Seasonal food supply requires a mode of life different from a regular, uninterrupted food supply.

The interdependence of cultural phenomena must be one of the objects of anthropological inquiry, for which material may be obtained through the study of existing societies.

Here we are compelled to consider culture as a whole, in all its manifestations, while in the study of diffusion and of parallel development the character and distribution of single traits are more commonly the objects of inquiry. Inventions, economic life, social structure, art, religion, morals are all interrelated. We ask in how far are they determined by environment, by the biological character of the people, by psychological conditions, by historical events or by general laws of interrelation.

It is obvious that we are dealing here with a different problem. This is most clearly seen in our use of language. Even the fullest knowledge of the history of language does not help us to understand how we use language and what influences language has upon our thought. It is the same in other phases of life. The dynamic reactions to cultural environment are not determined by its history, although they are a result of historical development. Historical data do give us certain clues that may not be found in the experience of a single generation. Still, the psychological problem must be studied in living societies.

It would be an error to claim, as some anthropologists do, that for this reason historical study is irrelevant. The two sides of our problem require equal attention, for we desire to know not only the dynamics of existing societies, but also how they came to be what they are. For an intelligent understanding of historical processes a knowledge of living processes is as necessary as the knowledge of life

processes for the understanding of the evolution of life forms.

The dynamics of existing societies are one of the most hotly contested fields of anthropological theory. They may be looked at from two points of view, the one, the interrelations between various aspects of cultural form and between culture and natural environment; the other the interrelation between individual and society.

Biologists are liable to insist on a relation between bodily build and culture. We have seen that evidence for such an interrelation has never been established by proofs that will stand serious criticism. It may not be amiss to dwell here again on the difference between races and individuals. The hereditary make-up of individuals has a decided influence upon their mental behavior. Pathological cases are the clearest proof of this. On the other hand, every race contains so many individuals of different hereditary make-up that the average differences between races freed of elements determined by history can not readily be ascertained, but appear as insignificant. It is more than doubtful whether differences free of these elements can ever be established.

Geographers try to derive all forms of human culture from the geographical environment in which man lives. Important though this may be, we have no evidence of a creative force of environment. All we know is that every culture is strongly influenced by its environment, that some elements of culture can not develop in an unfavorable geographical setting, while others may be advanced. It is sufficient to see the fundamental differences of culture that thrive one after the other in the same environment, to make us understand the limitations of environmental influences. The aborigines of Australia live in the same environment in which the White invaders live. The nature and location of Australia have remained the same during human history, but they have influenced different cultures. Environment can affect only an existing culture, and it is worth while to study its influence in detail. This has been clearly recognized by critical geographers, such as Hettner.

Economists believe that economic conditions control cultural forms. Economic determinism is proposed as against 'geographic determinism. Undoubtedly the interrelation between economics and other aspects of culture is much more immediate than that between geographical environment and culture. Still it is not possible to explain every feature of cultural life as determined by economic status. We do not see how art styles, the form of ritual or the special form of religious belief could possibly be derived from economic forces. On the contrary, we see that economics



and the rest of culture interact as cause and effect, as effect and cause.

Every attempt to deduce cultural forms from a single cause is doomed to failure, for the various expressions of culture are closely interrelated and one can not be altered without having an effect upon all the others. Culture is integrated. It is true that the degree of integration is not always the same. There are cultures which we might describe by a single term, that of recent times as individualistic-mechanical; or that of a Melanesian island as individualization by mutual distrust; or that of our Plains Indians as overvaluation of intertribal warfare. Such terms may be misleading, because they overemphasize certain features, still they indicate certain dominating attitudes.

Integration is not often so complete that all contradictory elements are eliminated. We rather find in the same culture curious breaks in the attitudes of different individuals, and, in the case of varying situations, even in the behavior of the same individual.

The lack of necessary correlations between various aspects of culture may be illustrated by the cultural significance of a truly scientific study of the heavenly bodies by the Babylonians, Maya and by Europeans during the Middle Ages. For us the necessary correlation of astronomical observations is with physical and chemical phenomena; for them the essential point was their astrological significance, *i.e.*, their relation to the fate of man, an attitude based on the general historically conditioned culture of their times.

These brief remarks may be sufficient to indicate the complexity of the phenomena we are studying, and it seems justifiable to question whether any generalized conclusions may be expected that will be applicable everywhere and that will reduce the data of anthropology to a formula which may be applied to every case, explaining its past and predicting its future.

I believe that it would be idle to entertain such hopes. The phenomena of our science are so individualized, so exposed to outer accident that no set of laws could explain them. It is as in any other science dealing with the actual world surrounding us. For each individual case we can arrive at an understanding of its relations to inner and outer forces, but we can not explain its individuality in the form of laws. The astronomer reduces the movement of stars to laws, but unless given an unexplainable original arrangement in space, he can not account for their present location. The biologist may know all the laws of ontogenesis, but he can not explain by their means the accidental forms they have taken in an individual species, much less those found in an individual.

Physical and biological laws differ in character on

account of the complexity of the objects of their study. Biological laws can refer only to biological forms, as geological laws can refer only to the forms of geological formations. The more complex the phenomena, the more special will be the laws expressed by them.

Cultural phenomena are of such complexity that it seems to me doubtful whether valid cultural laws can be found. The causal conditions of cultural happenings lie always in the interaction between individual and society, and no classificatory study of societies will solve this problem. The morphological classification of societies may call to our attention many problems. It will not solve them. In every case it is reducible to the same source, namely, the interaction between individual and society.

It is true that some valid interrelations between general aspects of cultural life may be found, such as between density and size of the population constituting a community and industrial occupations; or solidarity and isolation of a small population and their conservatism. These are interesting as static descriptions of cultural facts. Dynamic processes also may be recognized, such as the tendency of customs to change their significance according to changes in culture. Their meaning can be understood only by a penetrating analysis of the human elements that enter into each case.

In short, the material of anthropology is such that it needs must be a historical science, one of the sciences the interest of which centers in the attempt to understand the individual phenomena rather than in the establishment of general laws which, on account of the complexity of the material, will be necessarily vague and, we might almost say, so self-evident that they are of little help to a real understanding.

The attempt has been made too often to formulate a genetic problem as defined by a term taken from our own civilization, either based on analogy with forms known to us or contrasted to those with which we are familiar. Thus concepts, like war, the idea of immortality, marriage regulations, have been considered as units and general conclusions have been derived from the forms and distributions. It should be recognized that the subordination of all such forms, under a category with which we are familiar on account of our own cultural experience, does not prove the historical or sociological unity of the phenomenon. The ideas of immortality differ so fundamentally in content and significance that they can hardly be treated as a unit and valid conclusions based on their occurrence can not be drawn without detailed analysis.

A critical investigation rather shows that forms of thought and action which we are inclined to consider as based on human nature are not generally valid, but

characteristic of our specific culture. If this were not so, we could not understand why certain aspects of mental life that are characteristic of the Old World should be entirely or almost entirely absent in aboriginal America. An example is the contrast between the fundamental idea of judicial procedure in Africa and America; the emphasis on oath and ordeal in the Old World, their absence in the New World.

The problems of the relation of the individual to his culture, to the society in which he lives have received too little attention. The standardized anthropological data that inform us of customary behavior, give no clue to the reaction of the individual to his culture, nor to an understanding of his influence upon it. Still, here lie the sources of a true interpretation of human behavior. It seems a vain effort to search for sociological laws disregarding what should be called social psychology, namely, the reaction of the individual to culture. They can be no more than empty formulas that can be imbued with life only by taking account of individual behavior in cultural settings.

Society embraces many individuals varying in mental character, partly on account of their biological

make-up, partly due to the special social conditions under which they have grown up. Nevertheless, many of them react in similar ways, and there are numerous cases in which we can find a definite impress of culture upon the behavior of the great mass of individuals, expressed by the same mentality. Deviations from such a type result in abnormal social behavior and, although throwing light upon the iron hold of culture upon the average individual, are rather subject-matter for the study of individual psychology than of social psychology.

If we once grasp the meaning of foreign cultures in this manner, we shall also be able to see how many of our lines of behavior that we believe to be founded deep in human nature are actually expressions of our culture and subject to modification with changing culture. Not all our standards are categorically determined by our quality as human beings, but may change with changing circumstances. It is our task to discover among all the varieties of human behavior those that are common to all humanity. By a study of the universality and variety of cultures anthropology may help us to shape the future course of mankind.

## CONQUEST OF THE PHYSICAL WORLD<sup>1</sup>

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ACCORDING to the traditions of an ancient people, the progenitors of mankind, after tasting the delights of the fruit of the tree of knowledge, were commanded to "subdue the earth and have dominion over it." It is perhaps not an accident that the love of knowledge and the love of conquest are thus coupled together. It is rather a fundamental psychological association. "Knowledge is power" has become a proverb of the race.

"Subdue the earth" has had diverse expressions in fact. The career of man over the face of the globe has largely been one of destruction. The forests were destroyed. The hidden minerals, the noble and the useful metals were dug from the earth and dissipated. A later form of this ruthless destruction has been the irreversible dissipation of our stores of energy in the form of coal, oil and natural gas.

The phenomena, and the forces of nature seem to have oppressed the primitive mind with awe and fear. The savage man worshipped these awful forces as gods, while the progress of civilization may be measured in terms of the extent of the conquest and reduction of these natural forces to our uses.

The love of knowledge and the love of conquest

<sup>1</sup> Address of the retiring vice-president of Section B—Physics, American Association for the Advancement of Science, Atlantic City, December, 1932.

have been expressed through our impulses. There are impulses for discovery and for adventure. The original idea of conquest and adventure was to seek new lands, to explore and subdue and often to destroy other peoples. That there may be other adventures and other conquests is an idea of recent origin. The unknown domains that the primitive man fears, the civilized man conquers. Here are new opportunities for discovery, for conquest and for adventure. This is the finest type of conquest and adventure. In the pursuit of knowledge we injure no one and in its acquisition we benefit many.

Men dream of the excitements and the adventures of exploration of unknown lands, of the ascent of a mountain or the conquests of the air. These may be thrilling adventures. Both in value and thrill they are not to be compared to the discovery of a new phenomenon or a new law of nature. The conquest of a mountain or a pole, like those other conquests "sung by the Troubadours," lose their thrill with their accomplishment. The conquests and adventures of science are inexhaustible. There are always new lands to conquer. This is the real "Endless Adventure," rather than the pursuit of a transient political life.

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