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THE EMERGENCE OF HUMAN CULTURE

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THE EMERGENCE *of* HUMAN CULTURE

BY

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Chapter I

THE MEANING OF CULTURE

The question of man's place in the system of living nature has long been one of absorbing human interest. The problem presents special difficulties because of the fact that the answer touches upon man's estimate of his own basic worth. Whether we be scientists or laymen, the theme is likely to arouse within us two more or less conflicting mental attitudes. The one is in harmony with the view that man is merely the most complex and intelligent animal that has been evolved to date. The other inclines us to think of man as a being set apart from the brute creation—unique in both nature and destiny. The first of these views satisfies our intellectual demand for continuity and unity in the natural order, whereas the second makes appeal to our emotional self-conceit.

The notion that man is a mere animal has gained wide acceptance in scientific circles since the time of Darwin. The reason for this is not far to seek. The biologist has shown that man is a vertebrate—along with the fishes, amphibians, reptiles, birds, and mam-

mals. He has definitely placed him in the great class of mammals which includes as well most of the common domestic animals. He has demonstrated beyond cavil that man belongs with the apes and monkeys in the particular mammalian order known as the Primates. In fact, the evidence is overwhelming that man and such of the great apes as the chimpanzee and the gorilla arose from a common ancestor. In bodily form and function, the differences between man and his ape cousins are relatively trivial. And while man has far outstripped his laggard kin in the race of life, the apes appear to possess a rudimentary type of human-like intelligence. In view of such important evidences of genetic kinship, it is small wonder that most scientists have come to look upon man as a mere animal.

This general position has been greatly fostered by the fact that those who hold the contrary opinion have offered little in the way of serious and sound argument. Sometimes they are content to rest their case upon the simple assertion that anyone can see that man is something more than an animal. This *ad hominum* appeal is often clothed with a certain emotional vehemence which merely enhances its utter futility. Those with a theological bias are likely to contend that man is definitely distinguished from the animals by the possession of a soul. Nothing is to be gained, however, by importing vague and mystical concepts into the domain

of scientific discussion. Still others insist that man is unique on the mental side, and seek to make this the mark of the distinctively human. But the modern comparative psychologist is convinced that the difference here is one of degree rather than one of kind. The further the analysis is pushed, the more clear does it become that the basic mental processes of ape and man are strikingly similar.

Strangely enough, the most obvious and outstanding mark of human superiority has been generally overlooked in this connection. For the simple truth seems to be that man's primary claim to distinction rests upon the fact that he alone possesses a genuine culture. Of all the animals, only man domesticated himself and thereby originated a culture that has since evolved along exceedingly complex lines. The far-reaching importance of this fact has not been sufficiently recognized because of the current overemphasis upon the biological side of human nature. The notion is widespread, indeed, that man is merely an ape-like creature with a thin veneer of culture. As we shall see, the implication that culture is secondary and superficial is contrary to the common facts of everyday life. In a sense, it is true that man created culture but it is just as true that culture created man. The precise truth seems to be that both man and culture emerged from the animal level of existence at the same time.

As a matter of fact, mankind has been enmeshed in an artificial environment for so long that many cultural traits have become second nature to him. In the process of self-domestication, the so-called natural man gave place to a new type of being. Cultural and biological forces are now so interpenetrated that logical separation is almost impossible. Much that is cultural in human life passes for biological in the confused thought of the day. In a sense the very terms "man" and "human" imply some measure of cultural background. It would be difficult indeed for us to conceive of man as existing wholly in a state of nature. What could be more natural, then, than to think of culture as the unique factor which distinguishes man from all his kin?

The main arguments for this general viewpoint will be set forth in the present chapter. Much of the concrete evidence, however, must be reserved for treatment in the later chapters which deal with various aspects of the problem. It should be obvious that the facts and theories involved are closely related to numerous broad fields of knowledge. One phase of the problem is concerned with the ontogenetic or developmental aspects of culture. This will bring to the fore the age-old controversy as to the relative importance of heredity and environment in human life. The evolutionary phase of the problem must also be discussed.

This will involve the attempt to explain the origins of culture in terms of the concepts of natural science. Finally, the field of anthropology must be drawn upon in connection with various questions relating to the nature of cultural patterning.

THE INDIVIDUAL AND CULTURE

It will be necessary, first of all, to arrive at a just conception of the rôle of culture in the life of the individual. Although our inquiry will have to do primarily with civilized man, the results of the analysis may be readily extended to primitive man by the reader. Our chief interest will be to show that the biological or natural man is radically changed during development by cultural forces. As will be seen, the culture pattern of the group is superimposed upon the individual from the moment of earliest infancy onward. By the time maturity is reached, the whole gamut of organic activities have been re-patterned by cultural influences. This applies to the biological functioning of the body as well as to the more complex forms of social adjustment. In fact, the primary purpose of the cultural régime is to create a human being out of the growing animal.

Perhaps everyone will agree to the proposition that the human infant is a mere animal at birth. In common with other mammals it shares the natural impulse

to suckle the mother, to cry out when in pain or when disturbed, and to perform numerous other biological functions. The animal impulses of the infant are carried out promptly, without let or hindrance, unless they are interfered with from without by others. Nevertheless, even before birth cultural influences of an indirect sort have played their part. The activities of the mother, during the intra-uterine life of the infant, are culturally determined to some extent. The infant is ushered into the world at birth by a more or less definite round of cultural routine. In fact, the adequacy of this routine may settle the important matter as to whether the infant is to live or die. It appears, therefore, that the human being is never without culture contacts of some sort from the moment of conception onward.

The first phase of the direct cultural process consists essentially in the proper domestication of the infant. The elementary bodily functions are brought into harmony with the customs of the group by imposing simple habits of restraint. Such activities as feeding, elimination, crying, sleeping, and the like are patterned as to time, place, and mode of performance. This process of early socialization usually requires a prolonged period of careful and consistent training. A number of primate tendencies, such as thumb-sucking, placing all grasped objects into the mouth, etc., may be entirely

suppressed. In brief, the primary bodily functions of the infant are gradually modified so that they come in time to agree with the norms of the group. These early habits, associated with the domestication of the infant, are fundamental and relatively permanent. Some of them persist, indeed, throughout the remainder of the life cycle of the individual.

After the language age is reached, the influence of culture upon the child is increased a thousand-fold. Language itself should be regarded as a complex set of bodily habits which comes to replace the simple and inarticulate gibberish of the infant. The specific language patterns are imposed by the group in one way or another. The meaning of the vocal habits and of the sounds produced are likewise fixed by the conventions of the group. Moreover, language becomes an important instrument for the broadening of cultural contacts. The child now learns to express its own desires effectively and to understand and heed those of others. It learns to recognize such social distinctions as attach to age, rank, and other tribal relationships. It comes to play games according to rule and custom. The channels of thought are marked out by the folklore and ideas of current conversation. The attitudes and beliefs of the group gradually become those of the child. In civilized communities, the informal tuition of everyday life is supplemented by the formal discipline of the school-

room. The period of childhood is thus one long experiment in cultural habituation.

As maturity approaches, the social regimen becomes more and more exacting. The newly emerging animal impulses of the adolescent are placed in restraint by the customs regulating love-making and the sex life. Moral sentiments are inculcated and many additional duties and obligations are imposed. Conformity with group norms of conduct takes on a new importance because of its relation to personal success and prestige. The social pressure may be somewhat less direct in adult life but it is none the less effective in the development of the group type. The adult is never released from the check of customs, laws, and institutions. And, in the end, the acceptable modes of death and burial are more or less prescribed by the group mores. In brief, the whole pattern of human life, from the cradle to the grave, is cast in a cultural mold from which there is no escape. The specific pattern varies widely from tribe to tribe but the process itself is universal.

Perhaps no one would wish to deny the fact that human life is touched at every point by some measure of cultural influence. The real issue is with regard to the importance of such manifold contacts in changing animal nature into human nature. This issue is clearly revealed in the following queries. Is culture something that can be put on and shuffled off like a garment, or is

it part and parcel of human personality? Is social habituation only skin-deep, or does it involve a radical transformation of man's animal nature? Is man at his best no more than an ape-like creature posing under the mask of hastily acquired drawing-room manners? Or is it true, rather, that the deep-seated desires, purposes, and tastes of the individual are re-created by the long cultural regimen associated with the period of development?

As already indicated, we maintain that cultural forces go deep and change animal nature into human nature. To accept the opposite viewpoint is to deny the significance of habit in the realm of personality and conduct. For, in the last analysis, culture reduces to common habits of thought and action. As noted above, language is essentially a set of vocal habits of response. Folkways and customs may exist as knowledge but insofar as they are effective they are likewise social habits. The same may be said of beliefs, ideas, and sentiments. Even the tools and goods of culture have no significance apart from the habits of skill involved in their production and use. If human habit is deep-seated, then culture itself must be woven into the very fabric of the growing personality during the long period of development. In fact, culture eventually comes to be part and parcel of the sensory, neural, and muscular functioning of the individual.

The conception that the essence of culture is habit has been stressed by several writers. Malinowski (52) holds that "each generation of human beings is a laboratory in which reflexes, impulses, and emotions are formed during the period of development." This noted anthropologist also calls attention to the fact that the process of social habituation is often so effective that sentiments formed in a cultural matrix are sometimes held to on pain of death. It is common knowledge, moreover, that many of the habits formed in early life are extremely persistent. This fact is emphasized by religious leaders in arguing for parochial education, and by psychoanalysts in their search for the causes of personality difficulties.

It is true that the habits of thought and action of the individual are subject to change from time to time. Such changes arise, however, because of new and divergent social pressures and hence are not exceptions to the general rule. As previously stated, the process of cultural conditioning continues throughout the life cycle. The one thing that is quite impossible for a normal human being to do, however, is to shuffle off his cultural background entirely and revert to the animal level of existence; for the individual cannot well rid himself of the basic system of habits of thought and action which constitutes his own intrinsic personality.

PATTERNS OF CULTURE

Up to the present we have spoken of culture in a common-sense manner without attempting to define the term specifically. This mode of treatment was adopted purposely as being best suited to a first statement of the problem. It now appears desirable to bring into the discussion the specific terms employed by the social anthropologist in the description of cultural phenomena. This will enable us to deal more adequately with the several aspects of the general problem now before us.

The units or elements of culture are commonly referred to as traits. Culture traits may be associated with tools and other material artifacts, technical skills, manners and customs, ideas and beliefs, and social institutions. The following traits are known to be universal among present-day peoples: fire-making, cooking, marriage, magic, knife, spear, and twisted string of some sort. Basketry, pottery, fishing, and gaming nets, bow and arrow, and the domesticated dog are almost universal among modern primitives. Such traits as head-hunting, totemism, and blood sacrifice are restricted, of course, to the lower cultures. Our own civilization is so replete with diverse traits that it would be an almost endless task to enumerate them. The following may be cited to illustrate the wide variety to be

found: automobile, telephone, school, suffrage, theatre, football, racketeering, hand-shaking, scientific spirit, and labor movement. New traits are continually emerging in connection with rapid changes in our material and social order.

A distinction is sometimes made between the material and the social traits of culture. Under the first rubric would be included tools, machines, shelters, roads, means of transport, and the numerous other material objects of human artifice. The second category is represented by folkways, mores, laws, language, and the various types of political and social organization. This distinction is arbitrary and misleading in that it seems to imply that a culture trait may be purely physical. As a matter of fact, "material" traits have their social side and "social" traits their material side. Both aspects are always present, although the material factor may be more readily noticed in the one case and the social factor in the other. Such artifacts as tools and goods are significant only insofar as they enter into the active social life of the group. And social life, at the cultural level, is inconceivable without tools and goods of some sort.

The notion that some traits are purely material is especially objectionable because it tends to divorce culture from habit. But this is to confuse the tools and goods associated with a culture trait with the trait

itself. This matter will become clear if we stop for a moment and analyze such a "material" trait as the automobile. The physical machine is surely not a culture trait apart from the technological skills that enter into its production and operation. In fact, its cultural significance is mainly determined by the business and social uses to which it is put. If it were possible to destroy at a single stroke the automobile and its present sources of production, the knowledge and skill of man would soon bring about their replacement. But if man's knowledge and skill—the real core of the trait—should be lost, the existing machines would stand as idle and useless curios. It is clear, therefore, that "material" no less than "social" culture traits are essentially human habits of thought and action.

It is now generally recognized that traits are not the discrete units of culture that they were once thought to be. This is clearly indicated by the growing tendency to speak of trait-complexes instead of traits. Even when the term "complex" is not actually expressed, it is usually if not always implied. It is apparent from the most casual observation that any given trait is closely bound up with many others in the larger web of social relationships. This is true in primitive cultures as well as in advanced civilizations. As Wissler (82) has noted, the wild rice trait of the Ojibway Indians was not limited to garnering and storing the

grain as might be thought. On the contrary, it extended to such remote matters as property rights, labor obligations, etiquette, religious taboos, and the like. The full cultural significance of a trait cannot be grasped apart from a knowledge of its manifold social ramifications. It seems highly probable that the inter-relatedness of traits is roughly proportional to the complexity of the cultural context. It may well be recalled that modern civilizations are still suffering from the effects of a single manifestation of the war trait which occurred some two decades ago.

The analysis of a culture into traits, or trait-complexes, has serious limitations as to practical application. Unless a given aspect of culture can be fairly well isolated for study it is quite useless to make a show of knowledge by calling it a trait. Many of the less tangible phenomena of the cultural domain do not yield readily to the analytical approach. Moreover, a general culture pattern is something more than the sum of the elements or traits composing it. The manner in which the traits are subordinated to this larger dynamic unity can be understood only by a broad and synthetic view of the whole, for a culture is a genuine system rather than a mere collection of traits. A simple change in one respect is likely to bring about a fundamental reorganization of the whole. It is important, therefore, not to lose sight of the general pattern of a culture in

seeking to analyze it into elements. It is easily possible, here as elsewhere, to miss the forest because of the trees.

This principle of the unity of culture has nothing in common with the vague and mystical concept of the group mind. As already emphasized, culture inheres in the habits of thought and action of individuals. The larger collective aspects of culture are possible only because of the sameness of such habits among the members of the group. This sameness is insured by the long process of training associated with the period of development of each member of the group. A stimulus such as the flag tends to arouse a like response in many individuals at the same time. The result is a sudden outburst of patriotism. As a social pattern, the latter phenomenon transcends the individual by assuming a collective configuration. In brief, common habits of thought and action become suddenly organized into a specific dynamic unity.

It is usual to classify cultures on the basis of the degree of complexity or the type of organization represented. Perhaps, the most important distinction is that drawn between civilizations and the more primitive culture patterns. A civilization supposes the existence of a centralized political state, an advanced economic division of labor, and a certain measure of educational sophistication. The great civilizations of today are to

be found in Europe, Asia, and the Americas. The earliest civilizations probably arose in Eurasia during the Bronze Age, some seven or eight thousand years ago. The wide use of metals from that time onward made possible the development of urban life and the building up of large political units, or states, by war and conquest. Previous to that time, man led a roving, pastoral, or rural life, and constructed his tools and goods from such easily accessible materials as wood, stone, clay, bone, horn, and animal hides. The early stages of culture through which ancient man passed will be further discussed in Chapters III and IV.

Two general types of culture are commonly recognized among present-day civilizations: Oriental and Occidental. The former is essentially Asiatic in origin and distribution. The latter is Greco-Roman and Teutonic in origin, and is now dominant in Europe, America, and Australia. It is difficult to characterize these two general types of culture in a brief statement. According to Wissler (82), they differ in type of writing, art forms, musical forms, athletic conventions, and the like. Doubtless there are more fundamental differences which are, however, less objective and observable. Western culture is marked by scientific invention, mass education, individualism, democracy, and a rapid tempo of change. It is now in the process of diffusion among many of the Oriental peoples such as the Japanese and

the Chinese. Both the Oriental and Occidental types of civilization have greatly influenced the fifty or more primitive cultures that are still to be found among the backward peoples of our own day.

THE BIOSOCIAL BASIS OF CULTURE

Although a clear distinction can be drawn between the biological and the cultural, these two aspects of human life are very closely related. In general, it may be said that the biological constitutes the foundation upon which the cultural superstructure is built. The latter, as Kroeber (43) has put it, comprises the superorganic realm of social life. This realm is rocked and swayed, so he says, by the "oscillations" of underlying biological factors. Nevertheless, it continues to "float unimmersibly" upon the vast organic sea beneath. As a matter of fact, most anthropologists now insist that culture is *sui generis* and cannot be reduced to the biological level. There is much confusion of thought, however, as to the precise manner in which culture is related to the strictly organic factors in human life. Our present purpose will be to analyze this relationship in such a way as to develop a set of definite criteria of the cultural.

The dependence of culture upon organic factors during the ontogenetic or developmental process has been dealt with in some detail in an earlier section. As we

have seen, the culture patterns of the group are impressed upon the individual in the form of habits of thought and action. The changes that occur in behavior represent the influence of social nurture upon our animal nature. The biological organism constitutes the raw material which is to be patterned by the social forces of the environment. Organic factors may be said to be the grist for the cultural mill. The animal tendencies to be humanized, as well as a certain measure of intelligence and docility, must be possessed by the individual. It is clear, therefore, that the innate capacities of the organism set the limit beyond which culture patterning cannot go. In brief, the process of social conditioning presupposes a complex organism with the ability to adjust to the requirements of the group.

Culture is likewise dependent upon certain organic factors of phylogenetic origin which express themselves in the biosocial life of the group. The activities of the group in seeking to develop common patterns of behavior rest upon a broad foundation of innate social capacities. The natural tendency to train as well as the innate ability to be docile must be a characteristic of the type. It is utterly inconceivable that culture should arise among non-social or even semi-social species. A high degree of social integration on the biological level is a prerequisite for the emergence of culture. Strong

social tendencies within the group serve as the natural organic supports of culture patterning. This fact has led many anthropologists and sociologists to confuse the biosocial and the cultural orders. They fail to see that while culture is always social the social is not always cultural.

The mechanism involved in the evolution of the biosocial order indicates most clearly its organic character. Biosocial evolution is merely one aspect of organic evolution and hence depends upon the processes of germinal variation, heredity, and natural selection. The trend toward social complexity within a species is furthered by the elimination of the non-social, or the less social individuals over a long period of time. Such social tendencies and capacities as arise thus become fixed in the hereditary complex of the species and are transmitted to later generations directly. Biosocial characteristics are part and parcel of the hereditary endowment of the type. They bring about a measure of social integration within the group on the "instinctive" or biological level. The wide prevalence of some form of biosocial life among the animals suggests that the social factor possesses a genuine survival value.

The biosocial complex of man is highly developed and came as a direct evolutionary heritage from his anthropoid ancestors. The main features of it can be readily observed in the social life of the great apes of

the present day. Probably the chief biosocial pattern of anthropoid life is the relatively small family group. The maternal tendency is strong, as shown by the solicitous care of the young over a period of years. The dominant males of the group as well as the mother offer active protection to the young and feeble. The group feeds together during the day and the infant sleeps with the mother at night in the rude bed which she has prepared in the trees. The young play together and exhibit numerous types of social behavior. This human-like biosocial complex was millions of years old in the anthropoid line before man and culture emerged. It is still retained by man today, although definitely modified in numerous details by the cultural superstructure that has come to rest upon it.

The processes which characterize the cultural order contrast sharply with those of the biosocial order. They have no direct connection with the slow and laborious operations of organic evolution. The patterns that arise and persist in the cultural realm are not a part of the hereditary endowment of the type. In fact, the term "social heredity" is a vicious misnomer as applied to the workings of culture. The transmission of culture from generation to generation is secured by the continuity of the process of group conditioning. The common habits of thought and action are impressed by the elders of one age upon the young of the succeeding age.

The attitudes, skills, and customs of the group must be directly acquired by each generation in turn. Cultural evolution occurs when new and better traits are invented, or borrowed by the group, to replace or further elaborate the old. The survival of traits depends upon conscious or unconscious group selection rather than upon natural selection. In brief, cultural processes are ontogenetic in character whereas biosocial processes are phylogenetic.

The basic mechanisms of the cultural order may be enumerated as follows: (a) invention, (b) communication, and (c) social habituation. Invention may be displayed with reference to skills and tools, beliefs and customs, laws and institutions, and the like. Communication is necessary if the inventions of the individual are to be taken over by the group and thus become full-fledged traits. This function is performed in human society largely by means of vocal and written language. Doubtless gestures, facial expressions, and other types of conventionalized cues also play an important rôle. Invention and communication account for the rise and spread of cultural elements within the limits of a single generation. Social habituation is the mechanism which serves for the transmission of these elements to later generations. This function is performed by imitation, informal or formal tuition, and numerous types of social pressures. Insofar as it is

successful, it makes for the permanence of the prevailing culture pattern from age to age.

In harmony with the above analysis, it is now possible to set forth a definite criterion of the cultural. Those patterns of group life which exist only by virtue of the operation of the three-fold mechanism—invention, communication, and social habituation—belong to the cultural order. Such patterns of group life as exist by virtue of the hereditary endowment of the type belong to the biosocial order. These patterns are the natural and essential organic supports for the cultural order, but they are not culture itself. Moreover, unless the three-fold mechanism mentioned above is present and functioning within a group, there can be no culture no matter how complex the biosocial life may be. There must be invention because the very essence of the cultural order is artifice as contrasted with nature. There must be a workable means of communication so that the inventions of artifice may be spread throughout the group. This suggests the necessity of a language system of some sort to serve as the bearer of common knowledge. It seems altogether unlikely that a culture could emerge and maintain itself without the support of a well-developed capacity for vocal language. And finally, there must be some form of social organization which will function to habituate each new generation in the common artifices of the group.

CULTURE: AN EMERGENT

Our primary purpose up to the present has been to offer an analysis of the cultural order as we find it today. We now face the special problem of attempting to account for the origin and evolution of this order. This problem would be simple enough if we could accept the common notion that culture is a mere elaboration of the biosocial order. As we have already shown, however, this notion is false. The cultural order is superorganic and possesses its own modes of operation and its own types of patterning. It cannot be reduced to bodily mechanisms or to the biosocial complex upon which it rests. The conception of culture as a unique type of social organization seems to be most readily explicable in terms of the current doctrine of emergent evolution. The main outlines of this new interpretation of the scheme of cosmic evolution will be found in recent volumes by Conger (12) and Wheeler (79).

The doctrine of emergence differs from the more orthodox view of evolution in several important respects. In the first place, it lays less emphasis upon the principles of gradation and continuity in the evolutionary process. Proper recognition is given to the saltatory and novel character of certain systems which come into being from time to time. When a new system appears that is sufficiently unique, it is known as an

emergent. An emergent system has new properties and new modes of organization that seem to bear no definite relation to the old order from which it arose. In many cases, an emergent may represent the beginnings of a new line of evolutionary advance which ultimately becomes a distinctive level or realm of being. This new order transcends the old and cannot be reduced to, or explained in terms of, the pre-existing order.

Perhaps this conception can be made more concrete by citing a clear-cut illustration. The first type of living being may be regarded as an emergent from the non-living level of existence. It made possible an elaborate evolution of organisms capable of growth, reproduction, and behavioral adjustment. The radical novelty thus introduced is reflected in the basic division between the physical and the biological realms. The living organism is merely one of the numerous kinds of emergents that have come into being during the long course of cosmic evolution. The biosocial order and the cultural order both involve sufficient novelty to warrant their recognition as emergents of primary importance.

The cultural order finds its natural place in the hierarchy of social organization associated with living systems. Its proper position in this evolutionary scheme is indicated in Figure 1. As will be seen, the first level of this series refers to the non-social mode of animal life. The individual leads a solitary existence, except

when brought into contact with its fellows in connection with incidental aggregations and the like. From this primitive level, the biosocial type of organization

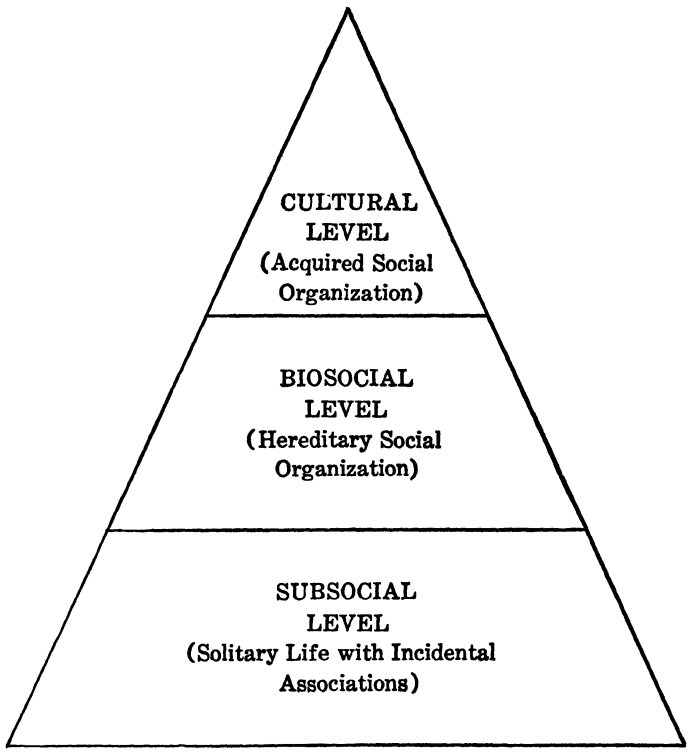

FIGURE 1.—EVOLUTION OF THE SOCIAL ORDER

The three major levels here shown might readily be broken up into a number of sub-levels in each case. The higher levels embrace the elements of the lower levels, arranged in a new pattern or setting. (Courtesy of C. J. Warden.)

emerged in time. Some of the manifold and elaborate patterns of the biosocial order will be described in Chapter II. Finally, the cultural order emerged from the biosocial level at the moment when the ancestral anthropoid became human. This new type of social organization has passed through numerous and divergent evolutionary patternings since its emergence. Such elements of this patterning as have survived, comprise the manifold culture traits of the primitive and civilized peoples of our own day.

The emergence of the biosocial from the non-social represented a great advance in the realm of social relations. Biosocial organization is distinctly limited, however, since it is dependent upon the slow and laborious processes of organic evolution. The tendency to be social and the bodily equipment essential to the specific biosocial pattern of the group must be woven into the hereditary fabric. The pattern itself, when once thoroughly fixed in the germ plasm, becomes extremely difficult to change. These limitations are well illustrated by the group life of the social insects, which will be discussed in the following chapter. It seems altogether likely that biosocial organization has reached the utmost limits of its expression in these forms. At any rate, it has advanced far beyond the rather loose biosocial pattern of the anthropoid type from which man arose.

The emergence of the cultural order marked the greatest advance that has yet occurred in social evolution. It meant the release of social patterning from the irksome bondage of organic evolution. An endless elaboration of the human social order can now occur quite independently of further bodily changes. Since culture traits are acquired rather than inherited, they can be either modified or eliminated by the group at will. The tempo of change may be as rapid as desired because invention, communication, and social habituation are under human control. The cultural order is self-propagative and can be understood only in terms of itself. Its workings cannot be explained by the most intimate and complete knowledge concerning the organic nature of man.

The cultural order added another dimension to the social life of man and thus has created for him a new realm of being. It has endowed him with powers that extend far beyond any that might have come with the further evolution of bodily equipment. The cultural order has fostered the development of technical skill in the interests of human comfort and enjoyment. It has induced a high order of social integration and cooperative endeavor. It has mothered science and the arts. It has created within man himself the aspirations, sentiments, and ideals that make him something more than a mere animal.

We have been able to present, in this chapter, only the main arguments for the general conception here advanced. Various lines of supporting evidence will be brought forward in the chapters that follow. Our first task will be to show that animal societies are biosocial in character rather than cultural. The second topic to be treated relates to the conditions under which human culture emerged. This will lead naturally to the general problem of primary and secondary patterning as exhibited in cultural evolution. The final chapter will deal with the influence of cultural changes upon human progress.

Chapter II

DO ANIMALS POSSESS CULTURE?

The question now before us has long been one of special interest to serious students of social evolution. Within this group may be included many biologists, comparative psychologists, anthropologists, and sociologists. The question resolves itself into a more definite and satisfactory form when certain important qualifications are duly recognized. In the first place, no one would claim that any infra-human "culture" has approached our own in complexity and richness of elaboration. Nor is it ever assumed that animal "cultures" must be organized after the same general pattern as our own. It is quite obvious, indeed, that divergence in organic equipment and biosocial requirements would be reflected in variety of culture patterns. The real question, then, is whether or not the social life of any of the animals exhibits a set of activities that may properly be classed as cultural. Is the cultural order essentially human, or has it emerged in various forms from time to time during the long course of social evolution?

The belief seems to be widespread among students of social evolution that some of the animals possess the rudiments of culture. The recent opinion of the anthropologist Franz Boas (9) may be taken as representative of this school of thought. He includes under culture the social habits of a community, individual reactions as affected thereby, and the products of human activity as resulting therefrom. This broad definition of culture implies, according to Boas, that "phenomena analogous to those of human culture occur in animal society as well." He says further that "many of the characteristic human adjustments are found in the animal world." This general conclusion is supported by such facts as the following: insects, birds, and mammals preserve food for unfavorable seasons; they build shelters; they store up provisions; ants cultivate fungi; apes use sticks and stones as tools, etc.

Boas insists, also, that "property rights are asserted by individuals and by animal societies." He holds further that "it is even doubtful whether the culturally determined, purely subjective behavior is entirely absent among animals. The habits of the bower-bird suggest a pleasure in form. Apes seem to enjoy ornaments and rhythmic movements. Domesticated animals distinguish forbidden acts from those permitted. There is no absolute gap between many of the aspects of human culture and the life habits of animals." A number of

other authorities might be cited, who have argued for this viewpoint in much the same vein.

The wide prevalence of this conception is due in part to the current over-emphasis upon the biological factors in human life. The notion itself would seem to be implicit in the principle of continuity in organic evolution as interpreted in orthodox circles. This principle appears to require that every human mode of adjustment be traced back ultimately to the animal level. As commonly held, it leaves no room for the emergence of a new and superbiological order. The distinctiveness of human culture is denied by regarding it as no more than an unusual elaboration of the biosocial complex. But if this be true, then surely cultural changes must be accounted for in terms of germinal variations and natural selection. As a simple matter of fact, however, such is obviously not the case. For anyone may observe manifold cultural changes constantly taking place in human society which have no hereditary counterpart in the biological realm. If cultural changes had to wait upon the slow and cumbrous processes of organic evolution, the human social order would still be where it was millions of years ago.

Perhaps nothing has led to a greater confusion in this connection than the tendency among students of social evolution to "ape" the biologist. This attitude is well illustrated by their attempts to press to the limit

the analogy between cultural and organic evolution. The sociologist Keller (39), for example, speaks of social variation, social heredity, and social selection as if they were the precise counterparts of germinal variation, heredity, and natural selection. Indeed, at times he hints that the two sets of processes are broadly identical, the social being a mere extension of the organic. The resort to such naïve biologisms in order to impart a scientific air to sociology is extremely unfortunate.

The notion that cultural and organic evolution are in some sense identical reminds one of the famous misconception of Herbert Spencer that a society is a genuine organism. As we have already pointed out, the basic processes of cultural evolution are invention, communication, and social habituation. These modes of functioning are ontogenetic in character and can have nothing in common with the phylogenetic processes of germinal variation, heredity, and natural selection. The former may resemble the latter in certain superficial aspects, but the resort to specific analogy here is not only absurd but vicious.

Another source of confusion is the common supposition that since culture is acquired, all learned responses must be cultural. Nothing could be further from the truth. The comparative psychologists have shown that even the simplest living organisms are capable of modi-

fying their behavior on the basis of individual experience. This applies to solitary or non-social types as well as to species that live in aggregates and in societies. It is clear, therefore, that if all acquired behavior is cultural then culture must be regarded as universal so far as the biological realm is concerned. It would be absurd to insist, however, that non-social organisms possess culture. The very essence of culture, as generally admitted, is its social character. We have seen, moreover, that the emergence of the cultural order presupposes the existence of a highly complex biosocial organization.

A clear distinction must be drawn, therefore, between acquired behavior as such and those habits which come to possess the genuine characteristics of culture. Many of the learned responses of the individual organism are not retained long enough to be made a permanent part of the behavior repertory. They are never taken over by the group and hence are not passed on to later generations by the process of social habituation. Such acquired responses have no cultural significance since they do not influence the general pattern of group behavior. They represent individual variations in capacity and experience. This type of acquired behavior is found in abundance among the animals in connection with their continuous adjustments to an ever-changing environment. Such individual habits often have no

social context whatsoever. Unless habits spread throughout the group, and are then transmitted by social forces to later generations, they do not possess cultural significance. To put the matter briefly: All culture patterns are acquired but not all acquired forms of behavior are cultural.

Before beginning our survey, it will be of value to call to mind some of the broader categories of animal group life. Several systems of classification, as proposed by different writers, have been cited in a recent volume by Allee (2). The system of Deegener comprises 92 distinct categories arranged under two general headings: accidental associations and essential societies. As Wheeler (80) has pointed out, this system is much too arbitrary and elaborate for ordinary usage. The simple classification of Alverdes (3) seems to be sufficient for our present purpose. This writer recognizes two main classes of intragroup relationships among animals: associations and societies. The former type is loosely integrated, relatively unstable, and does not appear to involve the presence of innate social impulses. These aggregations are induced by such external factors as common feeding grounds, breeding places, and the like. True animal societies, on the other hand, are integrated primarily by the action of innate social impulses of one sort or another. These impulses often cause an individual to exchange a favor-

able for an unfavorable environment in order to bring it into contact with other individuals of the same species.

It is clear that if the cultural order has emerged below the human level it will be found among the true animal societies. Our survey will be limited, therefore, to the following types which represent the highest evolution of societal organization: (a) social insects, (b) birds, and (c) mammals, including the monkeys and apes. It is usual to recognize the distinction between closed and open animal societies. A closed society is a community which excludes non-members in one way or another. Insect colonies or states belong in this subclass. Open societies are less exclusive and, as a rule, less well-integrated than closed societies. The specific individuals comprising the group may be brought together by chance, but once this has occurred social ties are immediately formed. Flocks of birds and herds and bands of mammals belong in this sub-class. Social integration is fostered in many cases by the presence of a temporary or permanent leader and protector. These several kinds of societal patterns will stand out with greater clarity as concrete examples are described in detail.

In dealing with each of the above types of animals, the first approach will consist in presenting a brief sketch of the actual social pattern of the group. It

should then be possible to give intelligent consideration to the question as to whether this pattern is partly cultural or entirely biosocial in character. In the last analysis, the presence or absence of cultural elements must be determined by applying the three-fold criterion developed in the preceding chapter. In order to draw a positive inference, there must be present in the social life of the group the three basic mechanisms of the cultural order: invention, communication, and social habituation. Nor will it be enough to show that one or another of these mechanisms exists within the social complex. All three must be found operating together as a system before we shall be warranted in affirming the presence of even the most rudimentary cultural order.

INSECT SOCIETIES

It is common to class as social insects the ants, the termites or "white ants," and some of the bees, wasps, and beetles. As is well known, societal organization among the insects has reached its highest stage of advancement in the ants and termites. These other types show, however, the same general trend in social evolution. This is indicated by the fact that the societal pattern, insofar as at present elaborated, is essentially alike for all. On this account, it will be unnecessary to describe the concrete social life of each of these types

separately. In fact, most attention will be given to the ants and termites which possess societal patterns of the greatest complexity at this level of existence. The analysis offered may then be extended, without further argument, to the other types of social insects enumerated above. Those who may be interested in the marvelous intricacies of insect societal life are referred to the works of Wheeler, Forel, and Alverdes cited in the Bibliography.

As Wheeler and others have pointed out, the single family is the center of social life among the insects. A hive of bees, or a colony of ants or termites, is simply a large family or "super-family." Each family consists of two parent insects and their offspring or of the fecundated mother "queen" and her offspring. The family or colony may become very large, especially in the case of some of the ants and termites. A colony of mound-building ants may contain 100,000 or more members, while a tropical termite colony may reach a membership of 3,000,000 or so. The usual insect family, however, is much smaller than this. As everyone knows, a new family is formed by swarming when a bee colony becomes too large for a single hive. In addition to the family unit, an insect colony may include slaves, aphids or "cows," and scavengers of various sorts. The presence of these foreign species should not blind us to the fact that the family is the basic

social unit. These foreigners merely complicate the general societal pattern, in certain cases, by adding thereto such interspecies' relationships as commensalism and parasitism.

The basic division of labor within the colony centers about the three primary biological functions: feeding, reproduction, and protection. In the more complex societies, each of these functions is performed by a special caste that has become structurally adapted for a particular task. The most widespread division is that between the reproductive and the worker castes. In ants, termites, and bees the normal reproductive activities are limited to the queens and such of the males as are essential to fecundation. The remaining females normally develop into members of the worker caste, while the excess of males degenerate into drones and are allowed to perish. This arrangement tends to limit the population of the colony in such wise as to insure a preponderance of neutral workers. The workers forage for food and other needed materials and care for the queen, pupae, and young. They also build the nest, keep it clean, and aid in the protection of the colony. In some cases, the workers are divided into sub-castes for the performance of one or another of these several tasks. A third or soldier caste is found among some of the ants and most of the termites, with powerful jaws or other special adaptations for fighting.

In certain cases at least, the soldiers are further divided into sub-castes which differ in bodily size and in fighting equipment.

As Wheeler (78) has remarked, the social insects represent nature's most startling efforts in communal organization. The whole social economy is based upon the caste system which is hereditary in character. The differences in bodily structure among the several castes and sub-castes are so marked as to be readily apparent to man. No one questions the fact that these differences arose through the agency of germinal variation, heredity, and natural selection. According to Wheeler, insect societies have evolved independently no less than thirty times from as many solitary types. In some cases, the fossil record shows that the evolution of the caste system was complete before the beginning of the Tertiary Age, 55,000,000 years ago. Since that time the societal pattern has remained unchanged except in slight and relatively unimportant particulars. This static character of insect societies holds for the simpler as well as for the more elaborate types of pattern.

A marked increase in the length of the life span probably had much to do with the evolution of insect societies from the sub-social level. The care of the young by the parent became possible as the life of the adult was extended to overlap that of the developing progeny. Instead of depositing her eggs in a pro-

visioned nest and then abandoning them to fate, the mother now lived to remain with the young and offer them food and protection. The more important stages involved in the socialization of the family relationship among insects have been worked out by Wheeler (80). At some point in the process, the dependence of the progeny upon the parent changed to the present condition in which parents and young are alike dependent upon the non-parental workers. This shift was doubtless closely associated with the restriction of reproduction to the fecundated queen and the differentiation of the worker caste. The neutral progeny now cooperate with the queen in rearing additional broods of young, and parents and offspring live together in an annual or perennial society.

Many of the innate social tendencies of the group are based upon the parent-offspring relationship. The latter is so fundamental, indeed, that it influences every activity of the colony. The workers retain the maternal drive, although the reproductive function is denied them, and spend their lives in the meticulous care of the young. Another innate tendency making for social behavior is that expressed in trophallaxis, or the exchange of food between individuals. This relation is mutual between young and adults, adults and adults, and between the members of the colony and the aphids and their allies when such are present. Doubtless, other

broad social tendencies would be found if analysis were carried further. The societal pattern is thus based, not upon a single social instinct, but upon a number of innate tendencies associated with feeding, reproduction, and protection.

These innate tendencies alone, however, are insufficient to account for the complex activities of the insect colony. There must be a ready recognition of foods, pupae, castes, nest-mates, and foreigners if the social pattern is to operate smoothly and efficiently. It seems likely that such recognition is based upon visual, olfactory, and topochemical cues. In flying types, vision is well developed and is doubtless utilized in making certain of these distinctions. The marked polymorphism within a group, and the diversity of bodily form among the various species of guests, would favor the use of visual cues. Olfactory cues are probably of still greater importance. Each member of an ant community has an individual odor in addition to the family odor and the changing nest odor. Foods and other materials would also have their specific odors. The detection of intruders of another species is known to depend upon the use of odor cues. The topochemical sense is well developed in all the ground-living social insects. It is generally believed that the capacity of these various sensory inlets to set off the innate tendencies mentioned above is determined by heredity.

The various lines of evidence so far examined all support the conclusion that insect societies are wholly biosocial in character. The societal pattern is phylogenetic in origin and has long since become a part of the hereditary endowment of the several insect types. A further elaboration of this pattern would involve the operation of germinal variation, heredity, and natural selection over a very long period of time. The impulses and activities of the individual are so pre-determined by its specific constitution as to fit perfectly into the social scheme. There is no necessity for social habituation during the period of development. The young take their natural place in the social order without any training whatsoever from their elders. It seems likely, indeed, that the social pattern is potentially present in a single pair of eggs representing the two sexes. If such a pair of eggs could be hatched and properly tended by man, doubtless the complete societal pattern would appear in time, even though all the adults of the species had been blotted out. It thus appears that nature has insured the persistence of insect societies by reducing the factors that are essential to the pattern to an hereditary basis.

The facts and interpretations set forth above are commonly accepted by both biologists and comparative psychologists. Nevertheless, a few students of social evolution still cling to the belief that insect societies

include certain cultural elements. It seems necessary, therefore, to consider this specific problem from another angle. It is conceivable, perhaps, that the basic biosocial pattern might be overlaid in some measure by cultural factors in the case of the more advanced insect societies. This possibility can be readily explored by a search for the three-fold mechanism of the cultural order: invention, communication, and social habituation. If it can be shown that one or another of these instruments is lacking, then the possibility of even a rudimentary cultural order in insect societies must be given up. The logic of this position has been established in the discussion of the preceding chapter.

There is no good reason to believe that the social insects possess the imagination and sagacity to make genuine inventions of any sort. It is true that the individual insect is able to modify its behavior from time to time to meet successfully the changing conditions of everyday life. It can be trained in the laboratory to run mazes and to form various other simple habits. The recent survey of Warden (73) seems to show, however, that the social insects do not excel the solitary types in this respect. The habits that they form are merely slight variations of their usual routine and even these are seldom retained for long. It may be that practice leads to greater efficiency in foraging, caring for the young, and other social activities, but this has

never been demonstrated. In any case, it is absurd to suppose that they invent genuinely new methods of performing these functions. The presence of special bodily equipment for carrying out such activities in the routine manner would effectively prevent this. The fossil record shows conclusively that the basic bodily equipment for social behavior is many millions of years old.

Even if an occasional insect "genius" should invent, it is not easy to see how the new social pattern could be communicated to the group. The question of a vocal language may be dismissed at once, since it is well known that ants, bees, and termites are unable to hear sounds. Moreover, the sounds which they produce in connection with breathing, movement of the wings, and the like are too incidental to possess social significance. It seems likely that the movements which accompany such sounds may arouse emotional excitement in other individuals. There is no evidence, however, that gestures operate as a genuine sign language among the social insects. It was once thought that the mutual stroking of the antennae by ants in passing, along with other movements of the head and body, might serve as a simple gesture language. Recent investigations have shown definitely, however, that such is not the case. The antennal stroking is the same for both friend and foe, the vigor of the response varying somewhat with

the degree of excitement exhibited by the ants. Since an adequate system of communication is lacking, there is no means for spreading a new social pattern throughout the group even if one should be invented.

It is sometimes maintained that the young members of the colony undergo some measure of social habituation during the early stages of development. There is no real evidence, however, that the young imitate their elders or that the elders train the young. The lack of both vocal and gesture language argues against such a possibility. If imitation and tuition are operative, they can be effective only in perfecting the social routine which has long since become hereditary. It seems much more likely that the social activities of the several castes come into play spontaneously as the proper stage of development is reached. Doubtless foraging, hoarding, nesting activities, trophallaxis, aphid-tending, and the like are as natural as breathing and reproduction to the social insects. At any rate, such patterns of behavior clearly belong to the biosocial rather than to the cultural order.

In view of the facts here set forth, it is difficult to understand why serious students of social evolution persist in stressing the analogy between insect life and human culture. The opinion of the anthropologist Franz Boas, in this connection, has already been cited in an earlier section of the present chapter. The noted

entomologist Wheeler (80) even goes so far as to say that "human and insect societies are so similar that it is difficult to detect really fundamental differences between them." As a matter of fact, the differences are so fundamental that the similarities appear altogether trivial and superficial. The one is phylogenetic and hence based upon hereditary mechanisms, whereas the other is ontogenetic and directly dependent upon invention, communication, and social habituation. The biosocial life of the insect is a fixed routine, while the cultural life of man is forever changing under the direction of human intelligence and ingenuity.

BIRD SOCIETIES

From the genetic point of view, all birds may be classed as either nidifugous or nidicolous. The former group includes those species in which the young are well developed at hatching and are able to leave the nest at once or soon thereafter. The young of nidicolous birds, on the other hand, are quite helpless at hatching. The eyes are still closed, the body is covered with down instead of feathers, and the wings and legs are not well enough developed to permit locomotion. They must be fed and warmed by the parent, therefore, during the relatively long period of infancy. As might be expected, the most complex patterns of Avian social life are found among the nidicolous birds. For

this reason, our brief survey will be limited largely to this group, which includes most of the small birds of our forests and meadows as well as the common fowls. For more detailed accounts of the social life of birds, the reader may refer to the writings of Howard, Thomson, Wetmore, and Alverdes listed in the Bibliography.

The general societal pattern of the birds is much less narrow and rigid than that of the insects. The individual is not so thoroughly subordinated to the group routine and hence has greater freedom of action. Bird societies must be ranked below the insect societies, insofar as economic and social integration is concerned. In the former, a strict division of labor based upon structural adaptations has not progressed very far. There is no such thing, for example, as a worker or a soldier caste. In many cases at least, even the secondary reproductive activities are shared alike by the male and female parent. It seems to be impossible, indeed, to classify bird societies as either open or closed. As a rule, they are closed during the mating and nesting season, but they may be open or only semi-closed at other times of the year. Sometimes birds of divergent species mingle together in the same flock or rookery. The factors which make for social integration, and the degree of integration secured, differ from one pattern of group activity to another.

The most important social pattern in birds is that

associated with the reproductive cycle. In its most complete form, this cycle includes the following set of activities: (a) migration to the breeding ground, (b) establishment of a specific territory for the nest, (c) courtship and mating, and (d) hatching the eggs and caring for the young. The first element would be lacking, of course, in the case of species which spend the winter in the region of the breeding ground. In forms that migrate, the spring movement is primarily due to the onset of sex gland activity, although the rise in temperature and other environmental factors may also play a part. Some species migrate in large and shapeless masses, while others fall into rows or into the well-known wedge or echelon formation. In the last case, the male or female leader is relieved from time to time. The spring migration brings the species to the ancestral breeding ground, whereas the fall migration returns it to the winter feeding ground.

The establishment of a specific territory for each nest, within the common breeding ground, seems to be a widespread phenomenon among birds. Although numerous variations occur, as noted by Howard (32), the following account may be taken as typical for the small birds of our northern woodlands. The male selects, after more or less casting about, a certain tree for the nest site. His right to the site is then established by fighting off for a time all other males that in-

trude upon his territory, which extends for some distance about the tree. When his right is secure, the male either builds a nest and woos a female, or first woos the female and then aids her in building the nest. Courtship usually involves song, sporting display, pursuit and withdrawal, and various related activities which are characteristic of the group. After mating, the eggs are laid and one or both parents engage in the act of brooding. The parent not so occupied flies about in search of food or stands by to protect the nest.

The number of eggs in the hatch, as well as their size and coloring, varies considerably from species to species. The young of many species take an active part in the hatching process. Pigeons and their allies, for example, rotate the body by means of the feet and peck around the shell so as to aid in breaking it open. The young of nidicolous birds are fed and cared for until they are able to fend for themselves. This task may be restricted to the mother or may fall to the lot of both parents. In certain penguin colonies, the young are apparently pooled and placed under the care of a few old birds while the other members of the group go in search of food. There is some reason to believe that, occasionally, the same pair of birds may come together and mate for several consecutive years. It is much more usual, however, for a male to mate successively with different females during a given season. In most

cases, the period of constancy seems to be coincident with the time of the single hatch. The notion that "monogamy" is common among birds, as stressed by both Brehm and Alverdes, is simply an absurd anthropomorphism. The most that can be said is that the usual family group constitutes a temporary closed society.

A number of social patterns, more or less distinct from the reproductive cycle, are found among birds. Many species show a definite tendency to move about in flocks by day and to rest in a common rookery at night. In species that migrate, the young gather into flocks in the fall and seek the winter feeding grounds. In some cases, these flocks of young set out independently and successfully reach the feeding grounds without guidance from the adults. This fact shows conclusively that migration is an instinctive rather than acquired behavior pattern. As pointed out by Warden (73), the sensory cues involved in migrating are not well understood at present. The tendency of birds to move about in flocks, either during migration or at other times, probably serves an important protective function. The same is even more true, perhaps, of the tendency of certain species to roost together at night. A cry of alarm from one bird operates as a warning to the group as a whole, when an intruder approaches the rookery.

Certain social patterns occur among domestic fowls which may be more widespread than is commonly supposed. In some cases, a group of adults that have lived together for a time become a semi-closed society. An intruder of the same species meets at once with a vicious attack and is often forced to retire. On this account, it is sometimes difficult to enlarge the flock by the introduction of new members. Moreover, a hierarchy of dominance commonly exists within the group itself. The experiments of Schjelderup-Ebbe on hens and ducks have been described at length in English by Alverdes (3). The order of dominance within the group is determined by fighting, both among the males and the females. The dominant fowl pecks at the inferior and drives it away from food, females, or other objects of desire. It receives similar treatment, in turn, from fowls that stand still higher in the scale of dominance. This social pattern is shown to rest upon innate factors, since it makes its appearance within a group of young fowls that have been reared apart from adults.

It is now generally agreed that the primary social patterns in bird life are all phylogenetic in origin and hence hereditary in character. This is certainly true of the entire cycle of reproductive activities. As noted above, the annual migrations between feeding and breeding ground can be explained on no other basis.

Doubtless this trait evolved in connection with the coming of a permanently colder climate to the temperate and arctic regions at some time in the remote past. The onset of the cold winter forced the birds to seek a warmer retreat in which food was more abundant. The coming of spring lured them back each year to the ancestral breeding grounds. These tendencies were fixed as a part of the hereditary endowment of the type millions of years ago. The same may be said of the proclivity to establish family territory rights within the common breeding grounds upon their arrival. As is well known, the type of nest, the number and coloring of the eggs, and the food and care bestowed upon the young are all species characteristics. The tendency to flock, to roost together in some cases, and to establish dominance hierarchies within the group are likewise based upon hereditary factors. It thus appears that the societal life of birds, insofar as we know it at present, is phylogenetic in origin and hence purely biosocial in character.

Is there any evidence whatsoever that this basic biosocial pattern is overlaid at any point by cultural elements? This question can best be answered by a search for the three-fold mechanism of the cultural order: invention, communication, and social habituation. The recent survey of Warden (73) seems to show that birds do not possess the intelligence necessary to make genu-

ine inventions of any sort. They can be trained in the laboratory to perform numerous simple tasks and doubtless vary their behavior under natural conditions within certain limits. It seems likely that old birds build somewhat better nests than the younger ones, but the latter do not invent new types of nests. Variations in nest structure within the species, when these occur, are due to the substitution of a new material for one that is lacking in the immediate environment. Such natural responses as pecking, hopping, flying, and the like are probably brought to perfection by practice, but strictly novel elements are not introduced into the behavior pattern. In some cases, homosexual activities are induced by segregation, but this involves no more than a minor shift on the stimulus side. In general, the bodily equipment of the bird is so nicely adapted to its natural mode of life that genuine invention would seem to be out of the question.

Birds possess no known gestural or vocal language by which new social patterns, even if invented, could be communicated to the group. It is true that many of them produce sounds which have a certain social significance, but these are emotional stereotypes that do not function as language proper. As Bierens de Haan (6) has noted, both the sound and its meaning for the group are innate for all members of the species. The chick peeps before it is hatched. The bird song comes with

sexual maturity and is limited thereafter, for the most part, to the breeding season. The challenge, the warning cry, and the several call notes are closely associated with protective and reproductive activities of an instinctive sort. These sounds are never dissociated from the organic context in which they were evolved. The parrot and its allies can be taught to imitate human language, but such "words" are never passed along by it to mates or progeny. Bodily attitudes and movements play an important rôle in bird courtship but they do not constitute a true gesture language. The only possible conclusion is that birds possess no means of communicating new patterns of thought and action to one another.

It has been claimed that some measure of social habituation occurs during the development of young birds. The instances usually cited relate to such activities as learning to fly and to the mimicry of song. It is well known that some mother birds cast their young out of the nest, and stand by to protect them while they make their trial flights. Such aid to the young in the perfecting of the flying pattern common to the species is quite a different thing from instruction in newly invented modes of flight. If the mother bird scolds and encourages as well as protects, she does so after the manner of the other females of the species. The capacity of birds to mimic the songs of other species in the

vicinity is probably more widespread than is commonly supposed. Young birds doubtless mimic their elders more or less in fixing the melodic pattern of the species. Mimicry thus aids in perfecting the natural repertory of vocalization. The song itself is not a newly invented type of response.

It is clear from the above analysis that the societal pattern of bird life is purely biosocial in character. This pattern is phylogenetic in origin and now rests upon hereditary mechanisms. Some of these mechanisms appear to require a nominal amount of practice in order to operate smoothly and effectively. In such cases, the means to bring about the necessary practice lie ready at hand in the biosocial environment. It is well to remember that acquired forms of behavior need not be cultural. The fact that invention, communication, and social habituation are lacking in the societal pattern forces us to conclude that the cultural order has not emerged among the birds.

MAMMAL SOCIETIES

This class of vertebrates includes a wide variety of types because of numerous adaptations for different life zones. Most mammals are terrestrial or fossorial but quite a number live in either an arboreal or an aquatic habitat. As might be expected, the social life is influenced in an important manner by the nature of the

habitat. A brief survey of mammalian societies is almost impossible because of the variations that occur from species to species. The difficulty is enhanced by the fact that there is a lack of authentic material in many cases. The information at hand is largely limited to the rodents, the carnivores, the grazing animals, and the monkeys and apes. This material will suffice for our present purpose, since the most complex societal patterns are to be found among these groups. For concrete details regarding the social life of the mammals, the reader may refer to the writings of Alverdes, Yerkes, and Zuckerman cited in the Bibliography.

In general, the social life of the mammals resembles that of the birds in several important respects. The group is rather loosely organized, as a rule, except during the period of mating. At other times, the herd may include a number of families, a number of individuals of the same sex, or members of two or more species. The nature of the group pattern, as well as the degree of permanence represented, varies considerably even among related species. The social life of the mammals, like that of the insects and birds, is closely associated with the reproductive, feeding, and protective functions. The first of these seems to offer the key to social patterning in the case of most mammals. For the present purpose, we may recognize two major types of reproductive patterns: (a) in which mating is restricted

to a definite season, and (b) in which mating is continuous throughout the year.

The first of these patterns appears to be quite widespread among the lower mammals. The mating season always occurs at approximately the same time each year, and may last for several weeks. The length of the season, as well as the specific time of its occurrence, varies considerably from species to species. The sexes are brought together for mating by the onset of functional activity in the male and female sex organs. During the inter-season these organs are quiescent insofar as mating activities are concerned. The organs of the pregnant female, which are essential to gestation and nursing, continue to function during a portion or all of the inter-season. This typical reproductive pattern shows certain variations in some species. The male dog, for example, is always fertile, while the female is in heat for two short seasons during the year. It is obvious that the rutting periods of the female determine the mating times in this case.

The seasonal reproductive pattern is characteristic of many of the carnivores, grazing animals, rodents, and certain other mammalian groups. Some fairly marked differences exist, however, as to the social relationships that obtain during the inter-season. It is believed that the leopard, bear, and various other carnivorous types live in solitude between mating seasons. They are sel-

dom found in pairs, or in male groups of more than two. Seals separate into male and female herds, the latter including the immature young, during the inter-season. In such rodents as the porcupine and the rabbit the sexes live together between the mating periods, but the sex organs are not functional during these intervals. The wild horse, prongbuck deer, and certain other grazing animals continue the family harem for a time after the mating season is over. As a rule, the harem ultimately disbands and the individuals unite into separate herds of males, females, and young. During the inter-season, mammalian herds and packs are usually associated with feeding and protective activities.

A few of the lower mammals mate throughout the year, but the continuous type of reproductive pattern has reached its highest social evolution in the monkeys and apes. In the great apes (gibbon, orang, chimpanzee, gorilla), the male is always sexually active and the female exhibits a continuous series of oestrus cycles. The same conditions hold in the case of most of the Old World and New World monkeys as well. This means that mating may occur at any time of the year. Doubtless the strength of the male sex drive varies considerably from time to time, but such changes follow no rhythmic pattern. The female sex drive is strongest about the middle of the menstrual cycle but the impulse to mate is never entirely absent. The problem of the

male is solved by the presence of an excess of females within the group. The cycles of the females do not synchronize, hence the greater the excess of females within the group the greater the stimulus for mating. Since monkeys and apes are essentially tropical animals, there is no reason why births should not occur at any season of the year.

As a rule, monkeys live in large troops, and sexual relations appear to be promiscuous within the social group. The same seems to be true of the gibbon and the siamang. The social unit of the orang is still a matter of dispute, but it is probably of the small harem type. The family or the family harem is characteristic of the chimpanzee and the gorilla. The former consists of male, female, and offspring, while the harem usually includes several adult females as well. Sexual relations are limited, for the most part, by the size of the group, but opportunities for mating beyond the family pale are readily seized upon. The monkey troop and the ape harem are by no means mere collections of individuals. In the troop, the older and more vigorous males exercise their preference among the females. In the harem, the male protector is supreme, while one or another of the females is likely to be favored from time to time. Social dominance within mammalian groups in general appears to rest largely upon sexual vigor and fighting prowess.

The care of the young provides another focus of social patterning among the monkeys and apes. The period of development is relatively long, and the maternal drive is strong and effective. Pubescence occurs in monkeys at about three or four years of age, and in the great apes at about seven or eight years of age. Monkeys and apes often continue to nurse their young for two or three years, although the mother's milk soon ceases to be the exclusive diet. Normal development of the young is aided by frequent exhibitions of play tendencies. According to Köhler (42), chimpanzees makes use of strings, twigs, pieces of cloth, and the like in play and bodily adornment. Young chimpanzees form friendly attachments, often non-sexual in nature, although the sexual motive comes to dominate as puberty is approached. Instances of social dominance have been observed among groups of immature chimpanzees. The tendency to play is common, of course, to many of the higher mammals. The same may be said of the various types of social dominance.

It is generally conceded that the primary social patterns of mammalian life are all phylogenetic in origin and hence hereditary in character. This is certainly true of the whole round of reproductive activities. The continuous and seasonal mating patterns are known to be hereditary. As Zuckerman (86) has shown, these may be different in closely related species occupying

the same territory. The reedbuck breeds throughout the year, whereas the bushbuck which lives in the same area has only a short mating season. The number of young born at one time and the general pattern of maternal care is also a species characteristic. The play of the young is strikingly similar to the adult reactions of the particular species, although it need not be regarded as imitative in the strict sense. The nest and the lair of mammals are also specific to the type. The hoarding of food by squirrels and other mammals is a form of innate behavior. The same is true of the formation of family harems, troops, herds, temporary packs, and all other social groupings. In fact, the entire social life of the mammals, insofar as we know it, is purely biosocial in character.

We may now inquire as to whether or not this basic biosocial pattern is overlaid by cultural elements at any point. If so, there should be some evidence for the presence of the three-fold mechanism of the cultural order: invention, communication, and social habituation. The recent summary of the experimental literature by Warden (73) shows that the higher mammals rank next to man in native intelligence. Beavers are able to build dams and nests successfully, although it has been shown by Warren (75) that their skill in this respect is commonly over-rated. Monkeys and apes in particular are adept at manipulating strings, latches,

knobs, and the like in opening problem boxes so as to secure food. Monkeys and apes can be taught to use sticks and boxes as tools under favorable circumstances. At times, they appear to approach the level of tool-making as when a stick that is too large for the purpose of the moment is chewed at until it will do. If such crude efforts constitute tool-making, then it seems likely that monkeys and apes possess a rudimentary inventiveness. But such an invention may serve little purpose, since the stick is likely to be discarded at once by the animal and not used again even in a similar situation. In any case, the making and use of tools by monkeys and apes seems to be limited to a slight extension of their usual manipulative activities, under favorable conditions. Such conditions are seldom present in their natural environment.

It may be admitted, for the sake of argument, that such of the higher mammals as the monkeys and apes are capable of producing crude inventions occasionally. The fact remains that they possess no gestural or vocal language by means of which these inventions might be communicated to the group. Their vocalization is more restricted in range than that of many birds, and reduces to a few calls and emotional outcries. As Bierens de Haan (6) has shown, the same may be said of mammals in general. Not only the sound itself, but its meaning for the group as well, is innate for all mem-

bers of the species. Yerkes and Learned (84) found that the following situations induced more or less specific sounds in the chimpanzee: hunger, eating, fighting, minor annoyances, apprehension, fear, pain, and friendly greeting. It is obvious that such sounds are merely emotional outcries and have no genuine language significance. Strangely enough, monkeys and apes in captivity make no effort to mimic the vocal sounds of man. Numerous efforts to train the great apes to reproduce human words, and to associate these with objects, have ended in disappointment. There is, indeed, no reason to believe that any mammal possesses the means of communicating new patterns of thought and action to the group.

It may be urged that young mammals undergo some measure of social habituation during the period of development. This would seem to be most likely in the case of monkeys and apes in which the period of infancy and childhood is relatively long. It is well known that young mammals are sometimes aided, scolded, and punished by their elders in various ways. The mother cat, to take a familiar example, often boxes the ears of her kittens. Adult monkeys are said to give aid to the young ones in climbing about through the trees. The present evidence seems to indicate, however, that such influences merely help the young to perfect the natural behavior patterns of the species. This

is quite a different thing from training the young in new types of response that have been invented and socialized by communication to the group. So far as is known, even an adult monkey or ape that may have invented a new type of skill shows no disposition to pass this along to the young. As noted above, such crude inventions as arise are seldom remembered by the individual himself so as to be utilized in similar situations later. Social habituation, as here intended, presupposes the presence of new patterns of behavior as common to the group.

The perfecting of natural patterns of behavior in young monkeys and apes is doubtless furthered by imitation. The recent study of Warden and Jackson (74) shows that the capacity to imitate one another is well developed in young rhesus monkeys. These animals were able to solve simple but artificial problems immediately after observing another monkey perform. This suggests that imitation may be an important means of social facilitation under the more natural conditions of the forest. Imitation might well be effective in connection with the manifold play activities during the long childhood of monkeys and apes. This would mean, of course, that the more complex behavior patterns of adult life are partially learned through observation. As noted in Chapter I, however, acquired responses in order to be cultural must be

socialized inventions. Since monkey and ape societies are totally lacking in socialized inventions, imitation can do no more than facilitate the development of the natural activities of the species.

The claim is sometimes made that our domestic animals have taken on certain of the rudiments of culture by virtue of their long association with mankind. It should be clear that such is not the case from an application of the principles already laid down. The dog and the cat may be readily house-broken but they do not impose these formalities upon their young. Man himself must train each generation anew. In accepting the conditions of domestication, these animals have secured a favored place in man's culture at the expense of disrupting their own natural life to some extent. Dogs and cats soon revert to the feral type once they are freed from human attachments. Dogs become wolf-like and dangerous within a generation or two. The surplus cats from a ranch in Death Valley, California, spread into the mesquite thickets this past year and turned wild. They are rapidly exterminating the rabbits, ground squirrels, quail, and other small animals of this region.

Dogs in particular display a marked ability to fit into man's social life. They can be trained to respond to human gestures and to simple verbal commands. The latter ability is well illustrated by the tests of Warden

and Warner (72) on the German shepherd, Fellow, in which correct responses were given to nearly one hundred commands. Such performances involve an association between articulate sounds and definite acts rather than a genuine understanding of human language. All attempts to train dogs to express human words have ended in disappointment. In general, domestic animals display marked social traits and high intelligence in submitting to man's cultural régime. Nevertheless, they are unable to take over human culture traits and impress them upon their progeny by social habituation. They are simply the wards of human culture. They did not domesticate themselves, as did mankind, and would all return to their natural wild state if man should decide to cast them off permanently.

We must conclude from the above analysis that the societal patterns of mammalian life are purely biosocial in character. These patterns are phylogenetic in origin and now rest upon hereditary mechanisms. Doubtless practice plays an important rôle in the development of the more complex patterns of behavior in the young. In the monkeys and apes, this process may be furthered by imitation and related forms of social facilitation. There is no reason to believe, however, that inventions are socialized and passed on to the young by social habituation. The lack of an effective means

of communication within the group, beyond the simple emotional level, would seem to exclude the possibility of a tradition of any sort. The biosocial life of the monkeys and apes is strikingly like that of man in many respects. The family harem of the apes probably differs little from the family unit of primitive man. Crude inventions, even though occasional and of momentary application, suggest a rudimentary human-like intelligence. The manipulatory activities of monkeys and apes, including the use of simple tools, point in the same direction. As we shall see, it was from a biosocial matrix of this general type that man and culture finally emerged.

Chapter III

THE EMERGENCE OF MAN AND CULTURE

From the analysis of the preceding chapter, the conclusion was drawn that even the rudiments of culture do not exist among sub-human organisms. For the sake of brevity, our survey was limited to the social insects, the birds, and the mammals, in which the highest forms of social organization are found. The principle was established in Chapter I that culture presupposes a complex biosocial substrate. The results of our analysis may thus be regarded as extending to all sub-human animals. In the case of each group examined, the basic societal patterns were shown to be hereditary rather than acquired. Moreover, no evidence was found that these primary patterns have been overlaid at any point by cultural factors. In every case, one or more elements of the three-fold mechanism of the cultural order—invention, communication, and social habituation—is lacking in the social life of the group. As previously indicated, even the most rudimentary culture is impossible unless all three elements of this mechanism are present and operating together.

In denying culture to animals, there can be no thought of ignoring the importance of their biosocial organization. As we have seen, this centers around the reproductive, protective, and feeding functions. It seems fairly obvious that these basic biological functions are favored by a well-developed social life. The relatively long period of immaturity of the higher animals calls for the care of the young under a social régime. The adult life of one generation must be so organized as to provide food and protection to the next generation until maturity is reached. Furthermore, the nests, flocks, and herds of social animals usually offer considerable protection to adults as well. This suggests that societal life possesses genuine survival value, as Darwin and many other students of evolution have strongly urged. It is well known that societal life is best developed among the higher organisms. The social insects stand near the top of the invertebrate evolutionary scale, while birds and mammals represent the most complex of the vertebrates. Biosocial evolution is thus an important aspect of the organization of the type and advances along with other forms of differentiation.

Numerous writers have tried to explain the biosocial order in terms of a single social or gregarious instinct. But this is simply to miss the main point altogether. A society is more than a mere collection of animals

drawn together by some vague, brooding force. It is a natural group so organized as to exhibit a number of definite social patterns. Nor is it true that these diverse patterns of activity arise by virtue of a single instinct or impulse. The mating and maternal drives obviously serve as a focus for the larger reproductive pattern. The hunger drive is doubtless the basic impulse in connection with foraging and related activities. The impulse to fight or escape is dominant in the more common forms of protective behavior. Animals do not come together into groups merely for the sake of being together, but because of definite activities that normally occur under group conditions. There is no general herd instinct, but there are a number of impulses that bring about herd formations of various sorts. The specific patterns which these social impulses take depend upon the types of bodily mechanism involved. The several mechanisms which make for social interlocking are part and parcel of the evolutionary heritage of the species.

The postulate of a single social instinct seems to rest upon the false notion that animal societies have evolved from simple associations. The latter are mere aggregations which collect from time to time because of such external factors as favorable temperature, food supply, and the like. There is a lack of definite social impulses and hence no genuine interaction among the

individuals. It should be clear that such simple associations could never have given rise to true societies. Societal patterns depend upon the presence of bodily organs and systems which yield specific drives when activated.

Probably the reproductive pattern was the first to appear in connection with the evolution of most animal societies. Wheeler (80) believes this to be true of the insects, the birds, and the mammals. This basic pattern presupposes a strong sex drive and a life span long enough to permit the overlapping of generations. The latter would make possible the maternal care of the young, and this, in turn, would favor a lengthening of the period of development. Little is known regarding the evolution of the secondary patterns associated with feeding and protective activities. In any case, biosocial patterns are too deep-seated in the structure of the organism to be explained as mere elaborations of non-impulsive animal associations.

It is now generally conceded that animal societies are polyphyletic in origin. According to Wheeler (80), the social level has been attained independently by no less than thirty distinct families of insects. It is known also that the societal patterns of the birds and mammals arose independently. Since the insects and birds fall outside of the main line of structural evolution leading to man, their social life can have no bearing upon

that of man. This important point is strangely overlooked by many students of social evolution in their search for genetic connections.

As a matter of fact, the biosocial pattern of man has no direct connection with that of any of the mammals except the monkeys and apes and related primates. The social life of the other mammalian orders arose independently after the primates had become a separate group. In fact, the key to man's basic biosocial nature is the societal pattern of the great apes. The social life of the monkeys may be ignored, since man's anthropoid ancestor had evolved beyond this level before the divergence of the pro-human stem. From the genetic point of view, therefore, only the biosocial patterns of man and of the great apes are sufficiently close genetically to warrant direct comparison.

Our primary interest in the present chapter is to offer an analysis of the manifold conditions under which man and culture finally emerged. The problem is exceedingly complex and must be approached from a broad evolutionary viewpoint. The first step in this analysis will involve a brief description of the structural and biosocial characteristics of the anthropoid ancestor of man and the great apes. The aim will be to show something of the common heritage of the pro-human and pro-ape stocks from this earlier primate level. The second step will involve a discussion of the

further evolution of the pro-human stock from this generalized anthropoid level onward. This treatment will bring to the fore the bodily and biosocial specializations which are distinctive of the trend toward the human type. Our final task will be to show how man and culture emerged from the biosocial matrix of the advanced pro-human level. This genetic approach should enable us to distinguish clearly between culture as such and the biosocial substrate upon which it rests.

MAN'S ANTHROPOID HERITAGE

An account of our anthropoid heritage may well begin with the stock from which man and the great apes ultimately arose. This common ancestral stock represents the stage in primate evolution at which the pro-human and pro-ape stems diverged. The more fundamental characteristics of both mankind and the apes may be traced back to this generalized anthropoid type. This advanced stage of primate evolution was preceded by the simian level which is now best represented by the Old World and New World monkeys. The simian stage had evolved, in turn, from the prosimian or lemuroid-tarsoid level. A brief account of the evolution of these several primate levels will be found in a recent volume by Warden (71). The present discussion will be restricted to the ancestral anthropoid stage, since the first definite human trend began at this

level. As indicated in Figure 2, the anthropoid stock broke up into the pro-human and pro-ape sub-types

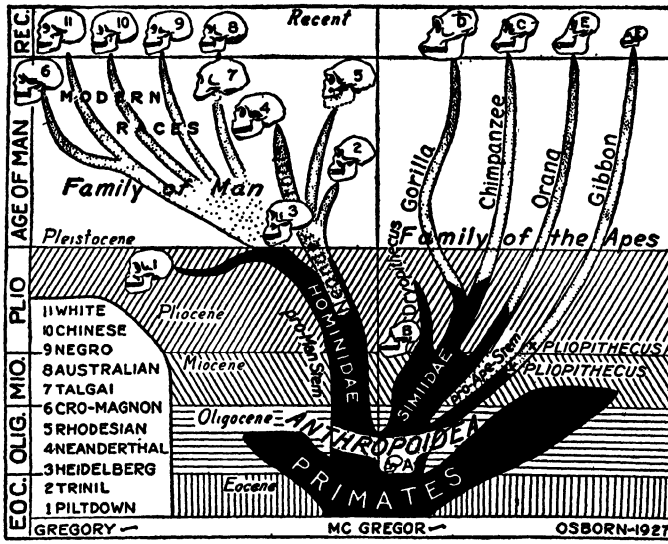

FIGURE 2.—THE ASCENT AND PHYLOGENY OF MAN

Left: Family of Man (*Hominidae*), dividing into the Neandertaloid and *Homo sapiens* stocks; present geological placement of the Piltdown. Heidelberg, Trinil, Neandertal, and Rhodesian fossils. Right: Family of the great Apes (*Simiidae*), including the Pliocene and Miocene dryopithecoids lying nearest to the ancestral anthropoid (*Anthropoidea*) stock; also the branching of the Simian stock into the gibbon, orang, chimpanzee, and gorilla lines. Below: Anthropoidea, the common Oligocene ancestors of the pro-ape and pro-human stocks; also A, Propliopithecus of the fossil fauna of Fayûm, Egypt. (From Osborn, H. F., "The Discovery of Tertiary Man," *Science*, Vol. 71, 1930.)

near the close of the Oligocene epoch, more than twenty million years ago.

No fossils of the ancestral anthropoid type have as yet been discovered, although Propliopithecus (Fig. 2, A) probably belonged to this general level. It is necessary, therefore, to reconstruct the physical and biosocial characteristics of the ancestral type from various lines of indirect evidence. In the first place, we know that this anthropoid was a type intermediate between the Old World monkeys, on the one hand, and man and the great apes on the other. Clearly then, it must have possessed all those structural traits of its simian heritage which fitted in with its own pattern of evolutionary advance. These traits may be discovered by a study of the basic bodily structure of the Old World monkeys of the present day. The advance of the ancestral type beyond the simian level can be determined, within limits, by an enumeration of the common characteristics of man and the great apes. In general, it may be assumed that such common traits had evolved in the ancestral type before the divergence of the pro-human and pro-ape stems. In applying this principle, some allowance should be made for the later perfecting of certain common traits in the two parallel stocks. In the main, however, common traits denote common ancestry, and this genetic key offers us a most important means of analysis.

The ancestral anthropoid was an ape-like creature similar in many respects to the modern gibbon. It was larger than the average monkey but much smaller than

the orang, chimpanzee, and gorilla of the present day. The marked increase in size in the higher primates came after the divergence of the pro-human and pro-ape stocks, following the principle of parallel evolution. The ancestral type possessed the general anatomical features of the larger apes. As Sir Arthur Keith (38) has pointed out, the bony structure of man and ape is the same except for such details as size, proportion, and the like. The same may be said of the internal organs and systems which condition the basic physiological processes. The ancestral type was also essentially ape-like in facial structure, locomotor appendages, dental formula, and the like. It possessed also the general blood constitution which is characteristic of the higher primates. The serological tests of Landsteiner and Miller show that the four blood types occur among apes as well as men. This suggests that these types were a direct heritage from the common ancestral stock. It thus appears that most of the fundamental structural and functional traits of the higher primates had been evolved before the pro-human and pro-ape stems arose.

These ancient anthropoids were quadrumanal or four-handed, rather than quadrupedal or four-footed like their mammalian relatives. The fingers of the hands carried flat nails instead of claws, and the thumbs were opposable. The hands proper were modified for brachiation, but were much less narrow and

hook-like than those of the modern gibbon which still continues to brachiate. The anthropoids were arboreal in habit and capable of moving swiftly through the forest by means of brachiation. In this form of locomotion, the upright body is suspended by the upstretched arms, which are hooked over the branches above. The modern gibbon is able to hurtle itself through the air as far as forty feet in passing from tree to tree.

Brachiation requires strong arms, highly developed eye-hand coordination, and superior motor control. This mode of locomotion contrasts sharply with the pronograde position taken by the lower primates in running along on the upper side of branches in quadrupedal fashion. The feet of the anthropoids were somewhat larger than the hands and the great toe was set off at an open angle from the other digits. Both the hands and feet were well adapted for grasping objects and for use in numerous kinds of manipulative activities. The latter probably included the utilization of sticks and stones as tools in simple ways, since even the monkeys possess some ability in this direction. In any case, the hands and feet of the anthropoids had evolved along lines that definitely favored at least a crude and clumsy use of tools.

The upright bodily posture of man and the great apes can be traced directly to the brachiation activities

of their common ancestor. As shown by Sir Arthur Keith (38), long-continued brachiation at this time brought about a fundamental reorganization of the body. The monkey, like the common quadrupedal mammals, has the chest flattened from side to side. In the higher anthropoids, the chest is flattened from the front backwards as in man, and the respiratory mechanism is modified accordingly. The visceral organs of the monkey are supported only by flat muscles across the abdomen, and tend to sag when the animal is placed in an upright posture. In the anthropoids, the muscles that had formerly served to depress the tail are spread out over the pelvic region to form a hammock for the support of the viscera. This meant the loss of the tail in the higher anthropoids, but it is obviously useless as a balancing organ under the conditions of brachiation. The base of the skull is continuous with the line of the backbone in monkeys, but in the anthropoids it is shifted to a position almost at right angles to the spinal column as in man. The upright bodily posture of man and the great apes is thus a direct heritage from their anthropoid forbears, although the ability to walk upright did not evolve until much later.

The ancestral anthropoids possessed a relatively large brain and a well-developed nervous system. The increase in brain size at this time was due mainly to the enlargement of the cerebral hemispheres. It was

associated with the elaboration of special cortical centers for the visual, auditory, tactual, and kinesthetic functions. The importance of these sensory functions to the activities of arboreal life can hardly be over-estimated. In the ground-living mammals, the sense of smell associated with the archipallium or old brain remained dominant. In the tree-living primates, the sense of sight associated with the neopallium or new brain gradually became dominant.

This fundamental shift had taken place long before the ancestral anthropoid stage was reached. Visual capacity, even in the monkeys, is about as well developed as in man. The same seems to be true of the auditory capacity as well. These facts suggest that space perception was probably highly developed in the ancestral type. Manipulative activities and brachiation demand superior motor control, and this was provided for by the elaboration of the kinesthetic center in the anthropoids. As Tilney (68) has shown, the basic sensory, neural, and motor patterns of man and apes may be regarded as a direct heritage from the ancestral anthropoids.

The biosocial life of this ancient stock was probably very similar in general to that of the monkeys, as described in the preceding chapter. The large troop rather than the small family harem appears to have been the basic social unit. According to Yerkes (85),

this is true of the modern gibbon which evolved somewhat later from the pro-ape stem. Within the anthropoid troop or herd, sexual relations were doubtless promiscuous, subject to the limitations imposed by the dominant males. The presence of only a single pair of mammary glands on the female suggests that no more than one or two infants were produced at a time. So far as can be judged, the care of the young followed the same general pattern as that found among the monkeys and gibbons of today. The same may be said of the feeding and protective activities. The anthropoid stock probably fed mainly upon fruits, nuts, and tender shoots. The chief mode of protection from ground-living enemies was doubtless swift escape into the trees, while active defense played a secondary rôle.

On the whole, the ancestral anthropoid was still a generalized primate type not only structurally but biosocially as well. Nevertheless, it ranked far above the simian level from which it had evolved. It had attained greater size and an upright bodily posture that favored the development of manipulatory activities along later human lines. A gain in intelligence is indicated by the increase in brain size and the growing elaboration of the cerebral hemispheres. These and other advances had not as yet become definitely set by specific differentiation. They represented potentialities which later became actualized in the pro-human and the pro-ape

stocks. The biosocial life of the anthropoids was rather loosely organized and this also favored the later channeling along human and ape lines. The value of the heritage of man and ape, from this common ancestor, rested largely upon the fact that specific patterning had not as yet proceeded far.

DESCENT FROM THE TREES

Long before the close of Oligocene times, the ancestral anthropoids had spread northward over the great plateaus of central Asia. This region offered a favorable habitat for them since it was more or less heavily forested and the climate was sub-tropical. A prolonged period of aridity set in near the close of this epoch, however, which extended far into Miocene times. This brought about the gradual extinction of the forests, especially to the northward which was also becoming colder. Naturally enough, many of the anthropoids along with other arboreal types followed the gradually retreating forests southward. These anthropoids formed the nucleus of the pro-ape stock, which ultimately gave rise to the gibbon, orang, chimpanzee, and gorilla. As indicated in Figure 2, the gibbon was the first to separate from the pro-ape stem, and the orang was next in order. The chimpanzee and gorilla stocks became distinct from each other at a much later time. Those anthropoids which remained in central Asia, with the passing

of the forests, formed the nucleus of the pro-human stock which led directly to primitive man.

It is an axiom of evolutionary biology that migrations of this sort are highly selective. The principal basis of selection, in the present case, was the degree of dependence upon arboreal conditions. The anthropoids which followed the retreating forests southward were those most thoroughly wedded to life in the trees. Perhaps they were more definitely adapted in a structural way to an arboreal existence than those that remained behind. On the other hand, they may have been simply more indolent or less intelligent. In any case, it is safe to assume that the anthropoids that stayed on in central Asia were a superior type. Moreover, it is generally true that the most highly evolved sub-types of a stock arise near the primary center of dispersion. As is well known, the passing of the forests influence the other mammals of this region as well as the anthropoids. It forced a like division among them into forest and plateau types. The latter reached their highest evolution, along with the pro-human anthropoids, on the plains and plateaus of central Asia.

It must be remembered that the process of selective segregation extended over a period of millions of years. In fact, the final separation of the pro-ape and pro-human stocks is usually associated with the Himalayan uplift in middle or late Miocene times. This would be

approximately eight or ten million years ago according to the latest system of chronology. The Himalayan uplift placed an impassible mountain barrier between the pro-ape and pro-human stocks. The intermingling of strains was forever impossible after this had occurred. By this time, the pro-ape stock had retreated well to the south and had broken up into several distinct types. The pro-human stock was now left to itself in central Asia and must either become adjusted to the new conditions of life or perish from the earth. Fortunately for later mankind, the forests passed away very gradually so that the essential structural adaptations could be evolved.

The popular opinion seems to be that man left the trees but it would be nearer the truth to say that the trees left man. For our humanoid ancestors probably continued an arboreal or semi-arboreal existence as long as they could do so. And well they might, for central Asia was over-run at this time by strong and carnivorous enemies. The earlier pro-humans, with no special equipment for fighting, could hardly afford to match themselves against the tooth and claw of the ground-living mammals. Nor could they hope to outrun their enemies, since their locomotor apparatus was as yet adapted to an arboreal habitat. Doubtless many of them became the prey of the wild and ruthless mammals that roamed the plains, when the natural protec-

tion of the forest was denied them. The elimination of the unfit over a long period of time made for a strong and virile stock.

So long as the early pro-humans remained semi-arboreal, they did not differ markedly from their pro-ape cousins. In bodily form and general behavior they were distinctly ape-like. The tendency to increase in size, which characterized the ancestral anthropoids, continued to show itself in both the pro-human and the pro-ape stocks. Such an increase, beyond a certain point, was distinctly unfavorable to brachiation and to tree life in general. The gibbon remained small, and, in time, perfected narrow hook-like hands and long arms for rapid brachiation. The hands of the orang, chimpanzee, and gorilla are less specialized, since the tendency to brachiate diminished as these types increased in bodily size. Eventually, the gorilla became so large and clumsy that it was forced to adopt a semi-terrestrial mode of life. Doubtless the pro-human stock increased in size at about the same period as the pro-ape stock. It seems likely that this trend was practically complete at least ten million years ago.

The increase in body size was attended by a lengthening of the period of immaturity and of the life cycle as a whole. This change took place independently in both the pro-human and pro-ape stocks. In fact, it represented a general primate trend that merely con-

tinued to operate beyond the ancestral anthropoid stage. The period of gestation was probably six or seven months in the latter type but is now nine months in the larger apes and man. Young apes, like the human child, are relatively small and helpless when born. The period of maternal care and partial dependency is also much longer than in the monkeys. Sexual maturity is usually reached by the third or fourth year in monkeys, but seldom before the eighth year in the great apes and man. It seems likely that this series of related changes was completed within a few million years after the divergence of the pro-human and pro-ape stocks. At the same time, the large troop naturally gave place to the family harem as the basic social unit.

The pro-human and pro-ape stocks thus continued to evolve along similar lines for a long period after their segregation began. As the forest dwindled, however, the pro-humans were forced to adjust themselves more and more to the new terrestrial life zone. The subtropical forests had been not only their natural protection but also their primary source of food. In time it became necessary to shift from the fruits and nuts of the trees to the seeds and grasses of the plains. Daring and skill might enable them to supplement this meagre diet with some of the small animals of this region. But this would mean entering into keen competition with

the strong and carnivorous beasts that were wont to prey upon them. As might be expected, a successful adjustment to these new life conditions involved the evolution of new structures adapted to a terrestrial existence. These mechanisms arose in the pro-human stock only as the ground-living stage developed. It is generally believed that this humanoid stage began approximately ten million years ago.

The comparative morphology of man and the apes offers the best key to an understanding of the bodily changes which took place from this time forward. Such a study reveals the fact that the more important humanoid specializations relate to the following functions: (a) erect bipedism, (b) manual dexterity, (c) vocal language, and (d) superior intelligence. As we shall see, the changes which took place in the lower limbs, the hands, the vocal organs, and the brain were all essential to the later emergence of culture. Numerous minor modifications of the humanoid body occurred along with such major changes, but these may well be ignored as having little or no bearing on our present problem. The structural changes underlying the four fundamental functions listed above may be regarded as representing the completion of the human biosocial order. On this account, the descent from the trees deserves to be considered as the most important event in the recent evolutionary advance.

HUMANOID SPECIALIZATIONS

Some measure of structural adaptation must have occurred during the semi-terrestrial stage of pro-human evolution. The humanoid stage, however, constituted the period of most rapid and marked specialization along human lines. As noted above, this period began about ten million years ago and ended with the emergence of the first primitive human type. It seems likely that some five or six million years of evolutionary advance was necessary to bring these structural changes up to a crude human level. As the humanoid period opened, the more strictly ground-living period of existence was beginning in real earnest. This meant that the humanoid stock must become specialized along human lines or forever perish from the earth. During the five or six million years that ensued, most of these creatures probably met such a fate under the ruthless hand of natural selection. This selective process was extremely rigorous by reason of the keen competition of life on the plains. The humanoids that managed to survive from age to age became less ape-like and more man-like as time went on.

As indicated above, the humanoid advance centered around the evolution of the locomotor organs, the hands, the language mechanism, and the brain. There is good reason to believe that the specialization of the

locomotor organs and hands began first in time and thus led the general advance. The appearance of erect bipedism and manual dexterity called for the further evolution of the motor and pre-motor centers of the cortex. These important trends were probably well under way before the evolution of the language mechanism began. The use of language necessitated the elaboration of a special speech center in the cortex. It thus appears that the evolution of the brain may be regarded, for the most part, as the natural concomitant of the evolution of new and important motor specializations. There is no need to assume, as Elliot Smith (63) has done, that cortical evolution occurred first in time and then dominated the specialization of the motor mechanisms. The logic of the situation demands that the temporal order in humanoid evolution be in agreement with the inciting environmental conditions.

The modification of the lower limbs and feet for erect bipedal locomotion was the most far-reaching structural change required. As is well known, the apes adopt a stooping posture when they attempt to walk or run on the ground. The hand-like foot provides an insufficient support for the body, hence the knuckles of the hands are brought forward in contact with the substrate. The latter is possible because the arms are very long while the lower limbs are quite short. In running erect, the weight of the ape body tends to fall upon the toes

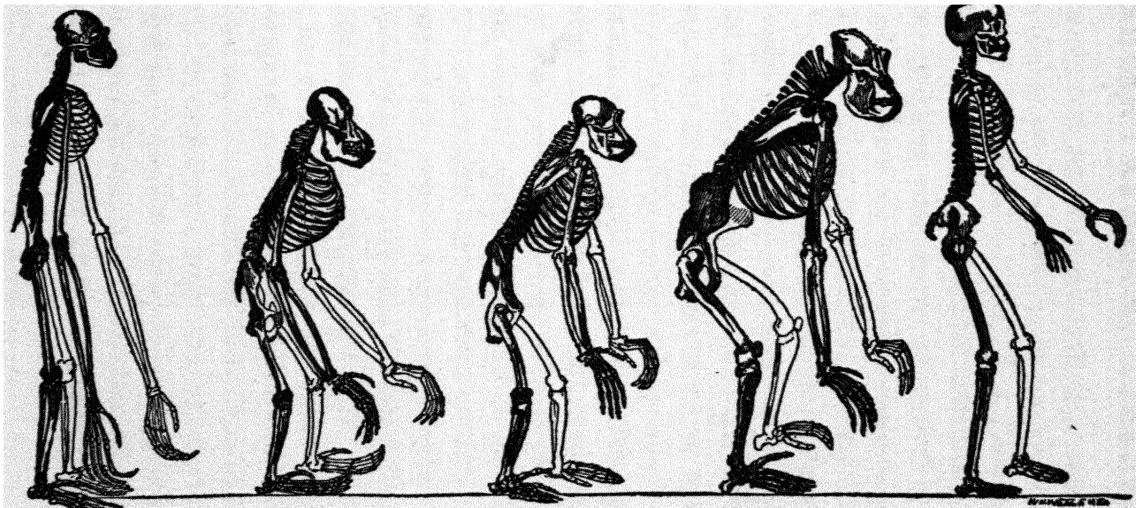

FIGURE 3.—SKELETONS OF THE GREAT APES AND MAN

The gibbon is drawn to a scale double that used for the others in order to show its skeletal characteristics more clearly.

(From Huxley, T. H., "Man's Place in Nature.") (Macmillan and Co., Ltd., England.)

rather than upon the heel as in human locomotion. The early pro-humans possessed these ape characteristics, although in a somewhat less extreme form. Effective bipedism depended upon the evolution of longer legs and of a human-like foot. The latter was especially important in making possible plantigrade locomotion, in which both the ball and the heel of the foot come in contact with the substrate.

The change in length of the lower limbs and the influence of this factor on upright posture are illustrated in Figure 3. As may be seen, the legs of man are longer than the arms, whereas the opposite is true of the great apes. The legs of the gorilla also increased in length somewhat after it was forced to adopt a semi-terrestrial existence. According to Schultz (61), the legs of the gorilla are little shorter than those of man when comparisons are made in the foetal stages. The difference in sitting height at this point in development is also relatively slight. These facts suggest that the lengthening of the legs in gorilla and man represents a parallel evolution arising from the shift from an arboreal habitat. The increase in length is greater in man than gorilla because he has been longer and more completely subjected to ground-living conditions.

The evolution of the foot in the humanoid stock involved the following important changes: (a) enlargement and strengthening of the heel, (b) arching of the

foot both longitudinally and transversely, (c) shortening of the toes and the turning of these face downward, and (d) retraction of the great toes with loss of the prehensile function. Some of the main differences in foot structure between man and the great apes are indicated in Figure 4. As will be noted, the foot of the

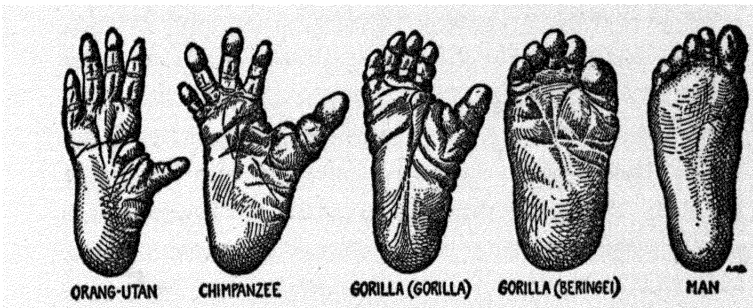

FIGURE 4.—FEET OF ADULT OR NEARLY ADULT APES AND MAN

Orang, after Schultz; Chimpanzee, after Schlaginhaufen, 1911; First Gorilla, after Hartmann, 1880; Second Gorilla (Mountain type), after Akeley, 1923. (From Schultz, A. H., 1926, "Fetal Growth of Man and Other Primates," *Quarterly Review of Biology,* Vol. I, p. 498.) (Williams & Wilkins Co., Baltimore, Md.)

mountain gorilla approaches that of man in many respects. This similarity is another illustration of parallel evolution arising from a shift to ground-living conditions. As is well known, the human foot passes through both the hand-like and the gorilla stages during development before attaining the human form.

Thus the marks of man's arboreal ancestry are still apparent in the foetal life of each individual.

The specialization of the legs and feet for effective bipedal locomotion doubtless required several million years of evolution. It seems likely that the earlier humanoid types sometimes walked erect and at other times dropped down on all fours. This is suggested by the fact that many children today pass through a quadrupedal stage in learning to walk erect. Nearly four hundred cases of this sort have been reported in a recent volume by Hrdlička (34). Most of these children were Whites, although a few were Indians, Eskimos, and Negroes. As a rule, the quadrupedal stage began about the seventh month and continued for four or five months until upright walking was firmly established. In a few cases, it was retained for some years thereafter, as a secondary mode of locomotion when unusual speed was desired. Whether this behavior is reminiscent of the humanoid stage or not, we know that nothing but an awkward, shuffling gait was attained until long after man had arrived upon the scene.

As erect bepedism advanced, the arms and hands became less essential to locomotor activities. This new freedom favored the modification of these appendages as organs of manipulation. The arms of the humanoid stock were probably no longer than those of primitive man and hence did not require modification. Naturally,

they ceased to lengthen after the descent from the trees, since they were no longer used in brachiation. The relatively long arms of the apes, as illustrated in Figure 3, represent further specialization for arboreal life after the divergence of the pro-human and pro-ape stocks. It has been observed that the difference in length of arm between man and ape is much less marked in foetal life. Moreover, the extremely long arms of the gibbon do not develop until some time after birth. These facts suggest that man retained the arm-length of the ancestral type, while the apes continued to brachiate and thus evolved the long arms they now possess.

Apparently the hands of the humanoid stock did not need to undergo any important structural modification. It is commonly believed that the generalized hand of the ancestral anthropoid was merely retained at this stage. This means that the humanoid hand was broad and strong and bore rather short fingers and a well-developed thumb. Perhaps the thumb was enlarged and strengthened somewhat at this stage. This would seem to be indicated by the fact that the thumb undergoes a marked acceleration in growth after the birth of the human infant. In any case, the changes which occurred in the humanoid hand were relatively minor in character. The marked differences between the hands of man and ape are to be explained by the further

specialization of the pro-ape stock for rapid brachiation. A glance at Figure 3 will show that long, narrow hands and long arms go together. As might be expected, the hands of the gorilla are much more generalized and human-like than are those of the other apes. It seems likely that the advance in manual dexterity in the humanoid stock was due largely to the evolution of the brain to take care of the increased activity of the arms and hands. This would involve the elaboration of the motor cortex and of the pre-motor centers which are essential to complex skilled movements.

As is commonly known, neither man nor ape possesses a special speech mechanism in the strict sense. In vocal language, use is made of the organs of breathing, and in gesture language the hands and arms are usually employed. The breathing apparatus is fundamentally the same in man and ape, apparently only minor structural modifications occurring at the humanoid stage. The vocal cords became firmer and stronger and the muscles of the larynx somewhat more specialized. The tongue increased in mobility and the lips evolved various refinements favorable to vocal expression. The gradual recession of prognathism, or the forward protrusion of the jaws, led to a more rounded and resonant oral cavity. This change would tend to increase the range of pitch as well, especially at the upper level.

The emotional cries of the apes are produced mainly in connection with the inspiration phase of breathing. For this reason it is practically impossible to train them to vocalize simple human words. In some manner, the humanoids must have hit upon the importance of the expiration phase of breathing to effective vocalization. Perhaps the evolution of the speech center in the brain should be regarded as the most important structural change associated with the beginnings of language. Such a center is entirely absent from the brain of the apes.

The trend toward superior intelligence among the humanoid stock is clearly indicated by the gradual enlargement and differentiation of the cerebral hemispheres. When this stage began, the brain was probably as large as that of the great apes of today. The brain of the orang, chimpanzee, and gorilla ranges from 300 to 500 grams in weight, whereas the body is much heavier than that of present-day man. The average human brain is about 1,400 grams in weight, ranging from 1,000 grams in the Australian pygmies to around 2,000 grams in the more advanced races. The cranial capacity ranges from 1,240 cubic centimeters in the Australian pygmies to 1,800 cubic centimeters in most races. The brain of the first primitive human type was, however, much smaller than that of present-day man. The cranial capacity of Pithecanthropus, who

lived in Java something over a million years ago, was only 940 cubic centimeters. That of Piltdown man, who lived in England about the same time, was 1,240 cubic centimeters. These facts seem to indicate that the humanoid brain increased greatly in size while the body weight remained approximately the same. The very large brain of modern man, however, arose from a continuation of this trend after the primitive human level had been reached.

The increase in size of the humanoid brain was most important because it represented in the main an enlargement of the cerebral hemispheres. It involved, moreover, the elaboration of special centers associated with the new forms of behavior that had arisen. As already noted, erect bipedism and manual dexterity depended in part upon the further evolution of the motor and pre-motor centers. Vocal language could not be effective until the cortical speech center had evolved. Perhaps the most remarkable advance in the humanoid brain, however, was the enlargement of the frontal lobes of the hemispheres. These are generally regarded as essential to thinking and the higher mental processes in man. It must be remembered that further enlargement and elaboration of the frontal lobes, and of the hemispheres generally, occurred after the human level was reached. Nevertheless, we may be certain that the low, shallow brain pan of the anthropoid gradually gave

place to the deeper and more human-like type of skull as the humanoid stage progressed.

It is obvious that the four humanoid specializations under discussion were directly related to environmental conditions and possessed genuine survival value. Erect bipedism was necessary to enable the individual to search for food on the plains and to escape from enemies by flight. Superior manual dexterity was essential to the effective use of sticks and stones as a defense against the swift-footed carnivores that roamed about. A rude language of some sort was basic to the development of simple forms of cooperative endeavor. The evolution of superior intelligence served to offset, in some measure, the natural handicaps of the humanoid stock in their new and strange habitat. Because of the fact that they possessed genuine survival value, these several structural specializations ultimately became fixed in the germinal complex of the stock. In time they passed to primitive man, thus exemplifying the principle that the habitus of the ancestor becomes part of the heritage of its remote descendant.

It is important to note that these humanoid specializations all favored a more complex biosocial life. This is especially true, of course, of the language function. The cortical speech center could hardly have evolved apart from severe environmental pressures that put a high premium upon social cohesion. The need of these

semi-human creatures for group protection and for mutual cooperation in the capture of prey is quite apparent. The shambling humanoid could neither outdistance the wild beasts that surrounded him nor ward off the attack of tooth and claw single-handed. A group of ingenious humanoids, wielding sticks and stones in concert, might readily save the day. Aside from manual dexterity, such cooperation called for the use of either vocal or gestural signals, or for a combination of both at once. Numerous forms of cooperative endeavor probably became common long before true articulate speech was developed. The biosocial complex of the humanoid stock still continued to center around the family harem. Nevertheless, it was greatly enriched by secondary patterning as the several structural trends advanced toward the human level.

EMERGENCE OF THE CULTURAL ORDER

No one knows precisely when the first primitive human type emerged from the advancing humanoid level. Unfortunately, no trace of the fossil record of this early period has yet been discovered. The oldest human fossils so far unearthed carry us no farther back than a million and a half years at most. About this time, Pithecanthropus of Java and Piltdown man of England were able to walk almost as erect as present-day man. Both possessed a considerable measure of

manual dexterity as shown by their cranial development and by their ability to construct crude stone tools. The cortical speech center was clearly present and, in Piltdown man at least, the frontal lobes were fairly well elaborated. These and various related facts seem to indicate that the actual transition from the humanoid to the human level had long since taken place. The weight of evidence, indeed, favors the view that the emergence of man occurred some four or five million years ago. This tentative estimate would place the event in middle Pliocene times, as suggested in the diagram of Figure 2.

The transition from the humanoid level to the first human type was coincident with the emergence of the cultural order. It was the latter event, indeed, which created the essential distinction. Moreover, the origin of man and of culture may be traced to the same series of evolutionary trends. These trends were represented by the four basic humanoid specializations discussed in the preceding section. As we have seen, these structural changes arose in response to social pressures and made for a more complex biosocial life. When sufficiently well advanced, they became the natural supports of the emerging cultural order. This was true simply because the postural, manual, vocal, and cortical adaptations were vitally essential to cultural processes. They supplied the bodily equipment, heretofore lack-

ing, to complete the three-fold mechanism of the cultural order: invention, communication, and social habituation. Man with culture emerged as soon as these humanoid specializations had evolved to the point where such a mechanism could operate as a unit. Although this event proved to be highly unique, it was brought about solely by natural causes in the ordinary course of evolutionary events.

The vital importance of the four humanoid specializations to the three-fold mechanism of the cultural order would seem to be fairly obvious. Manual dexterity and superior intelligence were essential, of course, to the invention and use of tools and other artifacts. But manual dexterity could hardly increase to a high level until erect bipedism had evolved and freed the arms and hands from accessory locomotor activities. The origin of vocal language made possible, for the first time, the effective communication of new skills and modes of behavior to other members of the social group. This meant that the results of inventive genius could readily spread throughout the group and thus attain genuine societal significance. Moreover, the inventions of head and hand could be passed on to the next generation by means of the language mechanism. This process of social habituation was naturally favored by the relatively long period of immaturity which came as a heritage from the humanoid stock. During this period

the simple and crude arts of the group could be impressed upon the growing young of the family harem by imitation and training.

A sharp distinction must be drawn between the biosocial matrix of the cultural order and culture itself. The specialization of the body up to the human level was brought about by purely organic processes. This stage of advance was merely the natural outcome of structural trends which began with the descent from the trees. The primary function of these bodily adaptations was to serve the increased biosocial needs of terrestrial life. As we have seen, these organic changes took place under the goad of natural selection. In time they became part and parcel of the germinal complex of the humanoid stock and were inherited directly by primitive man. In the end, however, these adaptations proved to be freighted with distinctly new and cultural possibilities. As they approached perfection, some measure of invention, communication, and social habituation was made possible. The appearance of this secondary function marked the end of the humanoid stage and ushered in the age of man. The humanoid specializations thus became genuinely human by evolving to the point where they could serve as the mechanism of the cultural order. When this point had been reached, culture emerged inevitably from this unique biosocial matrix.

Fortunately for mankind, the evolution of the body was not arrested by the sudden appearance of the first crude culture. Early man was still very close to nature in the raw, and natural selection continued to favor the perfecting of important structural trends under way. As organic evolution progressed, man gained in stature, his posture became more erect, and his gait grew more graceful. Manual dexterity improved as well, and the language capacity increased in efficiency. The brain practically doubled in size, eventually, and the frontal lobes and other association areas were further elaborated. The forehead tended to become higher and the brow ridges much less marked. The chin became more prominent as the jaw and dental arch decreased in size. These and related changes continued in process until the coming of *Homo sapiens,* or modern man, something like a half-million years ago. Such minor bodily characters as distinguish the several races of modern man must have evolved even later than this. No one knows how many early human types were eliminated by natural selection in the long process of perfecting the human form as we know it today.

The further evolution of the human body, after the emergence of man and culture, was a strictly biosocial process. This is clearly indicated by the fact that such modifications now rest upon an hereditary basis.

Doubtless cultural factors played some part in the process, but only insofar as they operated through the medium of natural selection. It is well known that the cultural aspect of human migrations, wars, racial segregations, and the like often involves important genetic consequences. This is due to the fact that the culture pattern may be selective with reference to the make-up of each successive generation. Furthermore, the group which possessed the superior culture would be most likely to survive, especially under the conditions of primitive life. In these early times, a superior culture probably meant little more than better means of securing food and better implements of defense. The presence of culture, as a new environmental factor, thus favored the survival of the highest human types from age to age.

As higher types of mankind were evolved, the cultural order tended to become more complex and effective. This does not imply that cultural evolution is merely one aspect of organic evolution. The rough parallelism between bodily specialization and cultural advance, during the early human period, was not based upon identity of process. As we have seen, the important bodily adaptations of primitive man served to provide more efficient mechanisms for invention, communication, and social habituation. The refinement of these structures was naturally attended by an improvement of

capacity on the functional side. This meant that the higher the bodily type the greater the cultural possibilities. But this parallelism should not lead to confusion. The advance in bodily perfection involved organic evolution and was fixed in the hereditary pattern of the type. The advance in cultural complexity arose from the utilization of this heritage, from age to age, in the development of a more effective social integration.

The parallelism between organic and cultural evolution came to an end, something like a half-million years ago, with the appearance of the present human species, *Homo sapiens*. The structural trends which were important to the cultural mechanism had reached their natural culmination in this large-brained type. The biosocial basis of modern human culture had now been perfected. The organic supports for the present-day cultural order had become a part of the heritage of this species. Cultural advance need no longer wait upon the slow and laborious process of organic evolution, since further structural adaptations were unnecessary. The social progress of mankind, from this time forward, has been dominated by cultural rather than biosocial trends. The former came into their own as the latter reached their natural maturity. In process of time, the inferior human types all became extinct, and *Homo sapiens* multiplied and spread over the earth.

Thus was ushered in the age of modern man and culture to which we belong.

The coming of modern man marked the beginning of a new and important epoch in the development of culture. For *Homo sapiens* was a distinctly superior human type and was much better equipped for a complex cultural order than his predecessors had been. In spite of this fact, however, this event cannot be ranked along with the primary emergence of culture some four million years earlier. It was this primary happening that was so genuinely unique and crucial. In fact, this event was as critical to the cultural order as was the origin of life to the biological order. It is culture *per se* rather than the degree of complexity attained which distinguishes man from his ape cousins. The fateful Rubicon was crossed when the first human type began to make use of the three-fold mechanism of the cultural order. Since this mechanism was far from perfect, the culture which then emerged was crude and simple. Nevertheless, it was in very essence a new thing under the sun. It represented the rude beginnings of a distinctly novel type of social integration.

This new type of social integration was unique in that it reached above the purely biosocial level. For the first time, invention, effective communication within the group, and the social habituation of the young became possible. The activities of the individual were

no longer limited to the instinctive repertory of the species. New skills could be invented by the superior individual and passed along to the other members of the group by means of language. Simple folkways could now develop out of the greater variety and intimacy of social contacts. These new ways of doing and acting, as accepted by the group, could be impressed upon the young through language and imitation. Such of the skills and folkways as survived from generation to generation comprised a rude tradition. This new mode of social integration was cultural rather than biosocial. The social patterning involved depended upon intelligence and learning rather than upon additional hereditary acquirement.

It seems likely that the stream of culture has been more or less continuous from the time of its emergence to the present. We know so little regarding the cultural contacts of early man, however, that a definite conclusion concerning this point cannot be drawn. It is barely possible that each human type that evolved, up to the time that *Homo sapiens* appeared, devised its own culture independently. This would seem to be improbable, however, since the higher human types evolved from lower types which always possessed a culture complex of some sort. Moreover, the superior type might well have made culture contacts with inferior peoples of the same general locality. The superior type sometimes

borrows culture traits from the inferior type even in connection with the extermination of the latter. In any case, some continuity in cultural tradition has been the rule since the coming of modern man. This is indicated by the universality of such basic traits as the use of stone artifacts and fire among the widely dispersed peoples of the very remote past.

Although the emergent character of the cultural order should be obvious, it may not be amiss further to elucidate this point. As noted in Chapter I, a primary emergent must not only be novel but must exhibit the power to initiate a characteristic evolutionary trend as well. The importance of an emergent is to be judged less by the initial degree of novelty than by the degree attained later as this trend becomes realized. This criterion is especially applicable to the present case, since the development of a rich and complex cultural tradition requires a long period of time. The early stages of cultural evolution, like those of organic evolution, were marked by a slow and monotonous advance. This was due in part, of course, to the imperfection of the threefold cultural mechanism in the several types of ancient man. Nevertheless, as the trend continued, the emergent order eventually came into its own, and led to the elaborate complexity of present-day culture.

The cultural order was unique in that it gave to man new and enlarged powers without exacting the tribute

of further bodily specialization. The underlying mechanism, once it had evolved, was left free to function along such lines as human ingenuity might dictate. The construction of tools, dwelling places, and other artifacts might be varied indefinitely within the limits of traditional knowledge and inventive genius. Moreover, the rate of variation was restricted only by these same factors. The advance in cultural complexity thus depended upon the intelligent use of bodily structures rather than upon the evolution of new specializations. This new order made for variety of social patterning from group to group and from age to age. It contrasts most sharply with the fixed biosocial life of animal species, in which type of nest, protective adaptations, and the like are determined by hereditary factors.

The cultural order was unique because the presence of language made possible a new and most important type of social integration. As shown in Chapter II, biosocial integration among the animals must be largely structural because an effective language is lacking. Such cooperation as obtains is limited in the main to set patterns of sexual and nest activities. The social significance of group contacts is thus greatly restricted. Human language, on the other hand, provided an effective functional means of societal integration. It fostered intimacy and variety of social contact and the recognition of rights and distinctions. The knowledge

so readily transmitted might be related to an endless variety of group interests. Coöperation was no longer hampered by a strict connection with the primary sexual and nest urges as in animal life. For the first time, individuals of the same sex could combine their forces in effective group strategy. Thus the basis of distinctive male or female groupings was laid to supplement the basic biosocial pattern of family life. Language also bridged the gap between generations by serving as the vehicle of tradition. It thus made for cultural continuity in the ceaseless stream of societal change.

In general, the emergence of the cultural order created a new and distinctive level of social life. This new societal realm was unique because it was characterized by a set of superorganic relationships. The latter are exhibited in the various types of cultural patterns which meet the eye on every hand. They rest upon the intelligent functioning of the human organism but have no organic correlate in the realm of the biosocial. The event of emergence initiated new social trends based upon the mechanism of invention, communication, and social habituation. Since the coming of modern man, these trends have continued without reference to the process of bodily evolution. Such trends must be explained, therefore, in terms of the cultural rather than the biosocial order. This means that, in the last analysis, culture can be understood only in terms of itself.

The cultural realm is as autonomous as are the inorganic and organic realms. Societal advance depends primarily upon the forces of cultural patterning and not upon biological factors. The manner in which these forces operate in the manifold elaboration of the cultural order will be described in the following chapter.

Chapter IV

THE EVOLUTION OF CULTURE

Our knowledge of the cultural advance during the long prehistoric period is based upon such evidences of human handiwork as the archeologist has brought to light. For the most part, these consist of implements of stone, horn, bone, and other hard substances capable of withstanding the ravages of time. The more perishable relics of ancient cultures are, of course, missing from the record. Such artifacts as have survived are usually so constructed as to reveal the several uses to which they were put. Because of this fact, it is possible to reconstruct within limits the customs and social organization of the period. The greater the number and variety of these artifacts, the more complete and dependable will be the reconstruction of the societal pattern. As might be expected, such traces of man's cultural life tend to become more numerous and revealing as we approach the dawn of history.

Unfortunately, the archeological record as known at present does not begin until approximately a million and a half years ago. About that time, Pithecanthropus

of Java and Piltdown man of England were living under the crude cultural conditions of the Eolithic epoch. This epoch was characterized by the use of a few stone tools of simple design and rude construction. It seems likely that a somewhat higher pattern of culture existed at this time in central Asia, although no traces of it have yet been discovered. This probability is based upon the principle that the highest culture of a given epoch should develop at the primary center of dispersion. We are justified, therefore, in considering the Eolithic culture of Java and England as only a rough indication of the level which had been reached by man at this time. In any case, the known Eolithic level affords us a basis of fact from which certain inferences may be drawn as to still earlier cultural developments.

In the first place, we may be certain that the rate of advance during these early ages was extremely slow. This was due, in large part, to the fact that the bodily mechanisms essential to a complex cultural order were still imperfect. As already noted, the full capacity for invention, communication, and social habituation, was not present in man until the appearance of *Homo sapiens,* some half-million years ago. Perhaps nothing more than simplicity, crudity, and endless monotony should be expected in the cultures of the earlier human types. The lack of natural capacity was abetted by the

lack of the necessary environmental pressures to force cultural advance. Ancient man was able to pluck from an abundant nature enough to satisfy his simple needs without recourse to arduous invention. He was essentially a gatherer rather than a toiler, and was under no great compulsion to scheme and plan. Since he wandered about over limitless regions, the important social pressures which make for cultural complexity were lacking. Under these circumstances, it is small wonder that the accumulation of tradition was slow and casual during these remote ages.

The level of culture during the long ages that preceded the Eolithic epoch must have been extremely primitive. Sheer bodily size and strength was then of more importance than later. A crude manual skill was sufficient to provide the necessities of life—food, shelter, and protection. Perhaps at first, man merely selected such natural objects as required little constructive skill to make them usable. A stone of the proper size and shape could be utilized and then cast aside. The same would be true of the limb of a tree. The scarcity of suitable natural objects, or the appearance of a newly developed need, fostered constructive skill as time went on. The shaping of natural objects in minor ways for use at the moment led eventually to the construction of tools that were regarded as worth preserving. When this stage had been reached, the notion

of property in some sense or other naturally arose. It seems likely that the Eolithic, or first stone age, was preceded by an age of wood that lasted a long time. Wooden implements would hardly be expected to survive from this remote period. If such were actually unearthed, as petrified objects, they would scarcely be recognized as man-made implements because of their crudity.

The usual domicile of early man must have been a haphazard combination of natural retreat and rude artifice. Such caves as were available were doubtless utilized, after the wild animals that infested them had been put to rout. Crevasses in the rocks and low overhanging bluffs were made serviceable by moving boulders into strategic positions. When these were lacking, a rude den could readily be constructed out of fallen trees and stones. The domicile served primarily as a fortress and not as a shelter from the wind and rain. The latter was unnecessary since ancient man still possessed the tough, hairy skin of his anthropoid forbears. The domicile offered protection to the sleeping family against the prowling carnivores of the plains. It was also useful as a place of safety for the mother and young during the day, when the male went abroad in search of food. For all we know, the domicile may have been enlarged at times to accommodate a group of families. Such an arrangement would permit the post-

ing of guards at night, and cooperative defense when attack ensued.

The small family harem was taken over by early man from his humanoid forbears with little or no change. As we have seen, this biosocial trait involves a certain limitation of sexual relations but not monogamy in the strict sense. Both monogamy and the proscription of incest represent a distinctive outgrowth of human culture. No one knows just when these culture traits, which are regarded as so basic to the modern family, were first developed. The specific circumstances which led to their invention are also unknown at present. It seems highly probable, however, that the trend toward these and related social ideals was favored by the banding together of families into large groups. Promiscuous sex relations within such groups would have led to endless dissension among the males and to the disruption of the larger group life. It became necessary, therefore, to devise barriers of some sort against incest and the violation of another's females. In brief, the recognition of sexual rights and property was necessary if the family harem was to be absorbed intact into the larger social life of the tribe.

It seems likely that some form of loose tribal organization arose soon after the emergence of man and culture. The family unit was sex-centered then as now,

and permitted only a simple division of labor between the male and female. It was much too small to serve as the basis of the larger societal patterns which were now in the making. Successful life on the plains required the banding together of the males for purposes of foraging and group protection. During such expeditions, it was obviously an advantage to arrange a number of related families within the same general locality. These loose tribal groupings favored a more complex division of labor which cut directly across family lines. Several bands of males might now be sent forth, each intent upon its own specific aim and task. These bands were held together in cooperative endeavor by common practical motives effectively socialized by means of language. As tribal organization developed, the family unit tended to become more definitely subordinated to the larger societal pattern.

Little can be said concerning the early development of folkways, because we know almost nothing of the language ability of ancient man. Emergent man possessed a vocal language but it was probably very rudimentary and may have remained so for ages. As we have seen, it arose out of the pressing demand for effective social cooperation after the descent from the trees. It began as a mere extension of the emotional cries of the humanoid to various immediate situations which called for group strategy. The cry of fear

brought out the group for defensive action; the cry of pleasure set the males in pursuit of the passing prey. For a time, the expressive aspect of vocalization was dominant over the symbolic aspect. As Sapir (60) has pointed out, no one knows either how or when articulate vocalizations became dissociated from their original expressive function. As this dissociation developed, vocal sounds tended to become more and more symbolic in character. Specific sounds came to stand for definite objects and processes in nature, as elements of a common experience. In thus reducing social experience to familiar forms, language operated as a most important instrument in furthering cultural evolution.

Numerous theories have been proposed to account for the origin and evolution of language. As recently pointed out by Warden (71), these theories throw little or no light upon the problem at hand. They all ignore the obvious fact that language evolved under the direct pressure of social necessity. It grew refined and precise only as the societal pattern, which it was helping to create, required a more effective medium of communication. The development of a highly symbolic language pre-supposed superior intelligence as well as a speech center and vocal mechanism. Since the human brain continued to increase in size until the coming of *Homo sapiens,* it may well be that a highly complex language was not developed earlier than this. On the other hand,

we know that a well-marked speech center was present in man at least a million years before the arrival of this modern type. On the whole, it seems probable that the more advanced types of ancient man were sufficiently intelligent to develop a fairly complex language. If such was the case, then we may take for granted the presence of simple folkways and mores in the social life of these remote peoples.

As noted above, the first definite traces of man's handiwork belong to the Eolithic epoch which began about a million and a half years ago. From this time forward, our sketch of the evolution of culture naturally becomes increasingly more factual and less inferential. The cultural advance from this epoch onward falls into a number of well-defined stages, as indicated in Figure 5. Although this sequence of stages appears to have been practically universal among mankind, our best knowledge of it is based upon the archeological records of Europe and closely adjacent regions. The first two stages—Eolithic and Lower Paleolithic—were developed by ancient man before the coming of *Homo sapiens*. As indicated by the chronology of Figure 5, both of these stages were of relatively long duration. The first stage belongs to the Tertiary period and hence was entirely preglacial. The second stage belongs to the Quaternary period and corresponds roughly in time with the first three great glacial and

interglacial epochs. The cultural record of modern man in the European region begins with the Upper

Period	Ice Age Chronology	Cultural Chronology	Human Types
Recent *Holocene* (30,000 Years)	Post-Glacial	Iron Age Bronze Age Neolithic Mesolithic { Maglemosean; Asilian-Tardenoisian	*Homo sapiens* (Modern Man)
Quaternary *Pleistocene* (970,000 Years)	IV Glacial (Würm)	Upper { Magdalenian; Solutrean; Aurignacian	Crô-Magnon Man
	3 Interglacial (Riss-Würm)	Paleolithic Lower { Mousterian	*Homo neandertalensis* (Neandertal Man)
	III Glacial (Riss)	Acheulean	
	2 Interglacial (Mindel-Riss)	Chellean	
	II Glacial (Mindel)		*Homo heidelbergensis* (Heidelberg Man)
	1 Interglacial (Günz-Mindel)	Pre-Chellean	
	I Glacial (Günz)		
Tertiary *Pliocene*	Preglacial	*Eolithic* { Foxhallian (Red-crag); Ipswichian Sub-red-crag	*Eoanthropus dawsoni* (Piltdown Man); *Pithecanthropus erectus* (Java Ape-Man)

FIGURE 5.—THE CHRONOLOGY OF PREHISTORY
(Modified from MacCurdy)

The time estimates of the several periods are based upon the rate of disintegration of radioactive ores in geological deposits. (From Warden, C. J., 1932. "The Evolution of Human Behavior," Fig. 12, p. 111.) (The Macmillan Company, New York.)

Paleolithic stage which coincided roughly with the Würm or last major glaciation. This was followed, in

early postglacial times, by the Mesolithic and Neolithic stages in the order named. The discovery of a method of producing bronze by the addition of tin to molten copper about 4000 B.C. ushered in the Bronze Age. The Iron Age began approximately a millennium later. The Bronze and Iron cultures developed in Egypt and southwest Asia, at the times here indicated, and apparently did not reach the European region until about 2000 years later in each case. The widespread substitution of metals for stone in the construction of artifacts laid the foundation for the development of modern civilization. The simple rural life of Neolithic man gradually gave place to the complex conditions associated with industrial and commercial centers.

MAJOR CULTURAL STAGES

No one knows how early ancient man began to construct rude tools by flaking flint stones of suitable form and size. Such construction would follow naturally enough from the long habit of selecting sticks and stones for use in emergencies. Nevertheless, it was a great forward step when man developed the art of chipping stones for specific uses and preserving them as more or less permanent implements. As known at present, the Eolithic or Dawn Stone Age covered a period of about half a million years immediately preceding the opening of the Old Stone Age. It would be

no surprise if future discoveries enabled us to extend this phase of stone-craft backward another half-million years or so. This possibility is suggested by the fact that some of the artifacts of the period under review were obviously developed from simpler types of implements. Moreover, a given method of working flints persisted for ages in these early times, once it had been hit upon by happy accident.

Eolithic flints have been discovered in connection with the remains of both Pithecanthropus erectus of Java and the Piltdown man of England. According to Osborn (57), the Foxhall deposits of England have yielded the following types of eoliths: (a) rostrocarinates or "eagle-beaks" flaked on both sides, (b) primitive arrow-heads, (c) rude spear-heads, and (e) simple scrapers and borers. Some of these were fashioned from the cores by chipping away the sides, while others were shaped from the larger flakes thus dislodged. A flint-working floor has been found in England where such eoliths were constructed, and a fireplace in which they were probably calcined to aid in shaping them. The smaller flints were used in dismembering prey, cleaning animal hides, and the like. The rostrocarinate seems to have been the chief weapon of offense and defense. It consisted of a smooth rounded base, which fitted the hand comfortably when grasped, and a thin beak-like distal end for inflicting injury. It was

doubtless an effective instrument for use at close range in killing prey and in attacking both animal and human enemies.

Little can be said, with any assurance, concerning the general cultural life of Eolithic man. The facts already cited demonstrate that methods of stone-craft formed an important part of his tradition. He possessed fire but we cannot be certain that he understood the art of fire-making. It is generally believed that ancient man secured fire from lightning conflagrations, and turned it to practical use, long before he had devised means of producing it at will. Nothing is definitely known concerning the family life of Eolithic times. The small harem family of earlier man may have been modified somewhat in the direction of monogamy by this time. If Eolithic man wore clothing, it must have been simply a rude animal skin hung about the body. The crudity of the eoliths suggests that art and ornamentation had not yet developed in any form. Man possessed a well-marked speech center but nothing is known regarding the extent to which language was utilized as a social instrument. It seems likely that the general cultural pattern was fairly simple at this stage, since the brain of Eolithic man was considerably smaller than that of modern man.

As the glacial epoch opened, Eolithic culture was supplanted by the Lower Paleolithic sequence which

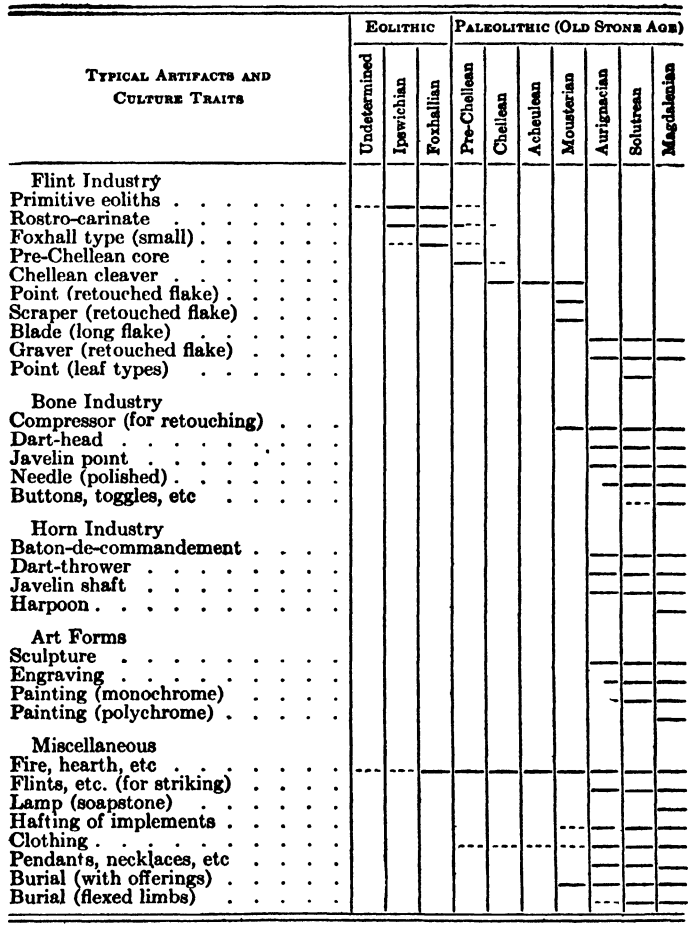

FIGURE 6. THE GROWTH OF CULTURE: EOLITHIC AND PALEOLITHIC AGES

The presence of an artifact or trait is indicated by a solid line; its probable occurrence earlier by a dash line. (From Warden, C. J., 1932. "The Evolution of Human Behavior," Fig. 15, p. 132.) (The Macmillan Company, New York.)

continued for nearly a million years. The first stage, or Pre-Chellean level, was apparently brought to the European region by Heidelberg man and his allies. This new human species possessed a larger brain than the Piltdown man and the latter was probably exterminated. The presence of rostro-carinates in some of the Pre-Chellean deposits would appear to link the Eolithic and Paleolithic cultures in a definite manner. The several types of flint tools associated with the Lower Paleolithic sequence are listed in the diagram of Figure 6. The chief tool of the Pre-Chellean level was the large flint core, sometimes weighing as much as seven pounds, and utilized after the manner of the rostro-carinate. This gave place in time to the Chellean *coup-de-poing,* or cleaver, somewhat lighter in weight and more smoothly flaked. The cleaver, or hand-axe, was further improved in Acheulean times by thinning down the body of the core and making the edge sharper and more regular. This instrument apparently served the same general purposes as did the earlier flint core tools.

A new and more skillful method of making flint implements was invented by Mousterian man. This involved striking off long blade-like flakes and retouching them by means of a percussion instrument of stone or bone. The heavy cleaver of the core type thus gave place to a variety of lighter and sharper tools. These

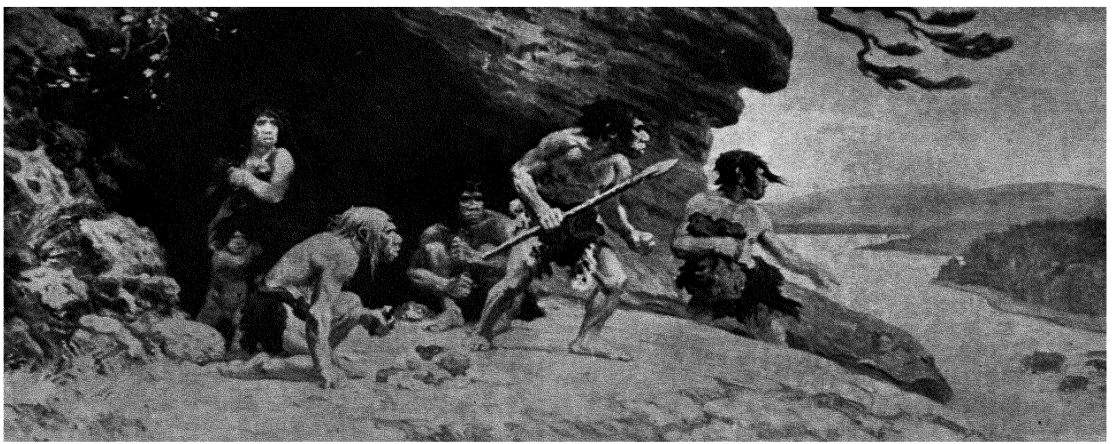

FIGURE 7.—NEANDERTHAL FLINT WORKERS

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included points, scrapers, gravers, drills, saws, knives, and the like. The presence of flint-working floors suggests that such implements were made by a special group of artisans. Perhaps the division of labor extended to other types of activities as well. The greater skill required in tool construction reflects the higher level attained in the material culture of the times. Strangely enough, this advance was not attended by the development of ornamentation of any sort. Although the rate of advance was very slow, Mousterian man was much better equipped with implements than any of his predecessors had been.

It is impossible at present to reconstruct the general cultural life of Lower Paleolithic times in a satisfactory manner. Heidelberg man apparently roamed the river terraces and plains in search of food, striking down large game by means of the heavy cleaver. Neandertal man, of Mousterian times, lived in caves and similar retreats after the manner suggested in Figure 7. The occurrence of large hearths at the mouth of some caves would seem to indicate that a number of families lived together under a simple communal régime. Doubtless the proscription of incest and the right of a male to his own females had become a part of the cultural tradition by this time. The use of fire for warmth and for roasting food seems to have been common enough. Probably animal skins were worn as a protection against the cold

climate of the glacial epochs. Such garments must have been rudely prepared since man possessed no instruments for sewing as yet. Personal ornamentation was largely ignored, although painting the body with clay pigments may have been resorted to on occasion. Near the close of Mousterian times, burial of the dead with votive offerings made its appearance. No one can say what superstitious beliefs may have been associated with this new cultural trait.

Upper Paleolithic culture was developed by *Homo sapiens,* or modern man—the only species possessing the full measure of human specialization. Little is known at present regarding the early evolution of this culture at or near the Asiatic center of dispersion. Since modern man emerged about a half-million years ago, his cultural evolution must have been in process in Asia when the Lower Paleolithic culture was coming to fruition in Europe under Neandertal man. The culture of *Homo sapiens* had reached the Aurignacian level when he spread into the European region approximately 100,000 years ago. Long before this, the species had broken up into the three great racial stocks: caucasoid, mongoloid, and negroid. In time, modern man completely exterminated the Neandertal cave-man and peopled the earth anew. Upper Paleolithic culture continued to evolve in the European region for about 70,000 years when it was displaced by the Neolithic

stage. It passed through three fairly distinct levels during this time, as indicated in Figure 5. The rate of cultural advance under modern man was very much faster than it had been under ancient man.

The relative richness and complexity of Upper Paleolithic culture may be seen by noting the number and variety of traits listed in Figure 6. The stone-craft of the Aurignacian invader of Europe included a great variety of blades, gravers, points, and the like, carefully retouched and occasionally notched for hafting. The flake type of stone-craft reached its zenith in the laurel-leaf and willow-leaf points of the Solutrean level, which were finely retouched all over by a special method of pressure flaking. In the Magdalenian phase, stone tools were largely replaced by better ones constructed of bone and horn. The darts, javelins, and harpoons of this level were highly polished and often richly engraved. Needles, buttons, toggles, and the like were invented, in connection with the bone industry, indicating definite improvements in the development of clothing. Pendants, necklaces, strings of beads, and colored clay paints were commonly employed in adorning the body.

When modern man invaded the European region he took over the caves and shelters of Mousterian man for his own use. These were supplemented in time by tent-like huts constructed of poles and animal skins.

Fire was used for warmth and cooking, and the presence of certain flints seems to show that the art of fire-making had now been discovered. Hunting and fishing were the chief pursuits of the age. The horse, reindeer, bison, and other mammals of the region were brought home to the cave or tent to be roasted for the community feast. Some of the hearths unearthed measure thirty or forty feet in diameter and are flanked by a mass of refuse containing the bones of 100,000 horses or more. The horses of that age were similar to the small wild type found in the Gobi Desert at the present time. The larger caves and retreats were probably inhabited by a large number of families, living under a communal régime, in which a fairly complex division of labor obtained. Separate crafts associated with the stone, bone, and horn industry, as well as with the various forms of artistry, probably existed. The division of labor may have extended also to hunters, fishermen, and various other groupings under more or less definite leadership. The right of private ownership may not have been recognized but community ownership must have been common indeed.

Perhaps the richness of Upper Paleolithic culture is best exemplified in the curious combination of magic and art which flourished at this time. The artistic impulse was expressed not only in the ornamentation of implements but also in the molding of bas-reliefs and

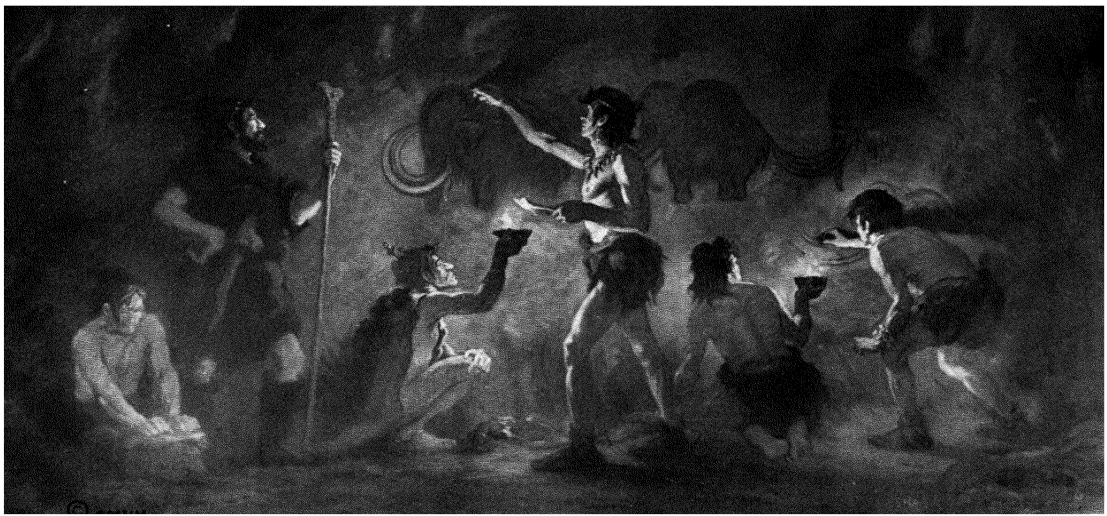

FIGURE 8.—CRO-MAGNON ARTISTS PAINTING THE MAMMOTH

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in the graving and painting of murals. The latter were not mere crude representations, but rather excellent realistic copies of common game animals and of ferocious enemies. These were drawn by the light of a stone oil lamp in the farthest reaches of caverns, as illustrated in Figure 8. The predominance of female game animals in the murals suggests that such portrayal was supposed to increase the fertility of these forms essential for food. The drawing of the cave-bear with humanly inflicted mortal wounds was presumably intended to work destruction on this ferocious enemy. It seems likely that prayers and incantations were associated with this magic cult. The presence of the dotted circle and of human phallic symbols may mean that some form of sun worship was already in vogue. Superstitious beliefs were doubtless associated also with the burial of the dead with their personal ornaments in place and with votive offerings of food and implements. In some cases the hands were folded over the breast, the lower limbs flexed, and the body painted. In general, the basic elements of modern culture are clearly manifested for the first time in the life of the Upper Paleolithic stage.

The Neolithic or new stone culture was brought into Europe by invaders from southwest Asia about 15,000 years ago. The first of these invaders were of Mediterranean stock, although the Alpines and Nordics soon

followed them. Many of the artistic Crô-Magnons of the preceding age were driven out or destroyed, the remaining ones being gradually amalgamated with the newcomers. The Neolithic invaders became the direct progenitors of the modern European peoples. The shift in population took place, for the most part, during the Mesolithic stage. The latter was transitional between the Upper Paleolithic culture and the Neolithic level proper. It included a curious mixture of elements drawn from the old and the new sources. The new traits included the use of the bow and arrow, the making of crude pottery, and the domestication of the dog. Many of the kitchen middens also belong to the Mesolithic stage, although these are more truly characteristic of the Neolithic age proper. The midden is marked by a vast heap of oyster, cockle, and other shells on the shore, where they had been cast aside by peoples who lived regularly upon sea foods.

The use of polished stone implements is usually regarded as the distinguishing mark of the Neolithic level proper. This new technique was applied primarily to such important tools as the axe and the pick. These stone tools were hafted and could be effectively used in felling trees, shaping small boats, building rafts, and in constructing shelters. The wheel was known before the close of Neolithic times but it was not extensively utilized until later. The general advance of this age

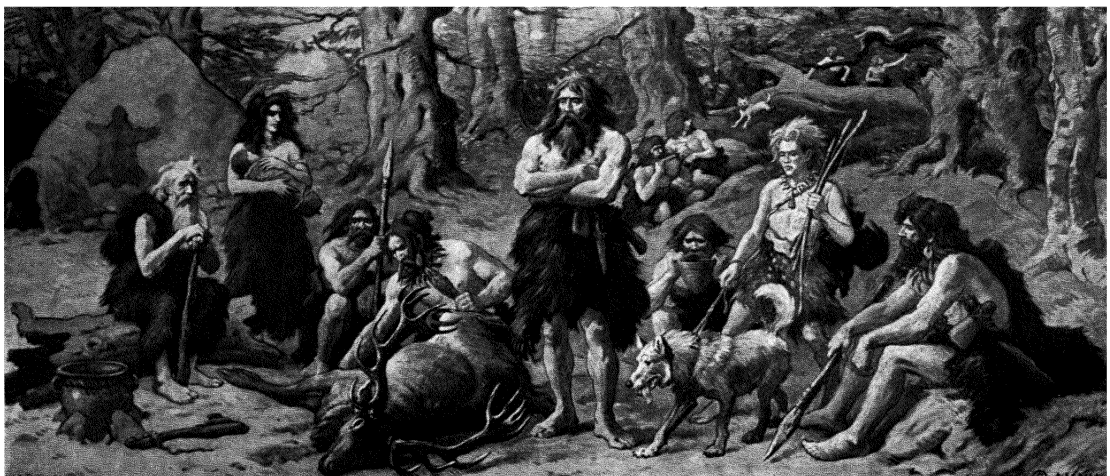

FIGURE 9.—STAG HUNTERS OF THE NEOLITHIC AGE

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centered around the following industries: pottery making, agriculture, textile weaving, and the domestication of animals. Agriculture among the Swiss lake-dwellers included the cultivation of wheat, barley, millet, lentils, and the like. Flax was cultivated for the fibre which was woven into textiles by means of simple but efficient looms. Knitting, spinning, and basketry were also developed. Cattle, swine, sheep, and goats were domesticated to provide a regular supply of food and hides. The lake-dwellers lived in pile-villages, built over the lakes for protection, these homes being relatively large and comfortable. The peoples of northern Europe were hunters rather than agriculturalists and lived in small pit-dwellings of the type illustrated in Figure 9.

The architectural skill of Neolithic man is best exhibited in connection with such megalithic monuments as dolmens, menhirs, cromlechs, and alignments. The dolmens or tombs varied greatly in type, some of them being very large and containing numerous chambers. The menhirs or monoliths sometimes weighed several hundred tons and stood as high as seventy feet. The transportation and rearing of such single stone slabs must have required skill and cooperation of a high order. The famous Stonehenge of England is a cromlech of very complex arrangement. The cromlech and alignment were probably associated with the practice of

sun worship. The prevalence of superstitions is indicated by the presence of pendants bearing symbols and by amulets made of circular pieces of bone removed from the skull by trephining. The dominance of the dolmen cult suggests that the burial ritual may have been somewhat elaborate. Pictorial art was neglected for the most part. In general, the cultural advance in Neolithic times followed the practical lines sketched above. The development of the village community, often fortified, shows that considerable progress had been made in the direction of effective social integration.

The Bronze Age came in gradually as the new metal culture diffused into Europe from the East. This infiltration began with barter but soon the methods of producing, hammering, and casting bronze became known. The stone and bronze implements competed for supremacy for centuries. Eventually bronze came to be used exclusively for the making of axes, saws, knives, razors, sickles, daggers, swords, and other such articles. The traffic in metals stimulated commerce in general and led to the diffusion of culture traits from one people to another. Trade was encouraged by the construction of larger ships and by the devising of weights, measures, and monies. Communication was advanced by the invention of systems of writing. The "hoe culture" of Neolithic times was displaced by the rude

wooden plow drawn by oxen. The horse was domesticated and used as a mount and as a chariot animal. The village gave place to the city as a commercial center and as a stronghold in times of war. Political domination was furthered by the conquest of peoples and the levying of tribute. In fact, human culture reached the level of genuine civilization during the Bronze Age. The social trends thus established gained great momentum as methods of working iron were discovered. The beginning of the Iron Age may be regarded as roughly coincident with the opening of the historical period.

This brief sketch gives us merely a bird's-eye view of the general course of cultural evolution up to fairly recent times. Nevertheless, it is sufficient to reveal the basic nature of the process in its larger aspects. One outstanding point is the relatively slow rate of progress made prior to the coming of *Homo sapiens*. This was doubtless due in large part to the fact that ancient man did not possess the full measure of bodily powers and intelligence. The basic mechanism of invention, communication, and social habituation was still in process of evolution. It should be remembered, moreover, that the growth of culture is cumulative in character. Emergent man had to begin at the zero point of tradition. Probably happy accident had much to do with his invention of simple skills and ways of living. Each suc-

cessive age thereafter could draw upon the cumulative tradition of the past. Such discoveries as stone-craft, the use of fire, and metal-craft meant the beginning of new trends making for industrial complexity. The development of the family as a definite and cooperative unit within the community and the tribe fostered the trend toward social integration. Even magic and other superstitions played an important rôle in the general advance which finally culminated in modern civilization.

THE UNIVERSAL CULTURE PATTERN

The question now arises as to whether or not we may properly speak of a general pattern of culture that is universal for mankind. There is considerable disagreement among anthropologists regarding this point. Those who deal most directly with the manifold concrete traits of diverse cultures usually insist that the concept of a universal culture pattern is not warranted. They appear to find only endless variety in comparing present-day primitive cultures with one another and with the more advanced civilizations. However, this attitude would seem to be due to a lack of proper perspective—an instance of failing to see the forest for the trees. It arises from the common tendency to place too great an emphasis upon the structural aspect of culture and to neglect its functional significance. Surely no one

would wish to deny that the essential functions served by the cultural order are much the same for all present-day peoples.

The issue is greatly confused because of the common failure to distinguish clearly between primary and secondary culture patterns. In its primary phase, culture is embodied in certain general types of activity which are closely related to the underlying biosocial order of the species. This connection is so intimate, indeed, that the primary culture pattern is regarded by some as a mere extension of the biosocial order. The biosocial-cultural nexus is highly important but it should not lead one to suppose an identity between these two realms, for, as we have seen, the cultural order is unique and operates by virtue of its own fundamental mechanisms: invention, communication, and social habituation. Nevertheless, this mechanism rests in part upon an organic basis, particularly upon the human specializations discussed in the preceding chapter. In a sense, then, the primary culture pattern cannot be divorced from its natural biosocial foundation. The distinction between primary and secondary culture factors would seem to be fairly obvious. The latter refers to specific traits and trait-complexes which vary widely in form among different peoples and localities. The process by which such specific patterns are elaborated from the general types of activities which comprise

the primary culture pattern will be discussed in the section which follows.

This view of the matter is strongly supported by the main facts already presented concerning the emergence and evolution of culture. As we have seen, the cultural order emerged from the anthropoid biosocial order in response to certain new environmental pressures. These pressures favored the evolution of bodily mechanisms—locomotor, manual, cerebral, and vocal—which made possible the cultural order. The known cultural stages of ancient man (Eolithic and Lower Paleolithic) show a close correlation with the degree of organic specialization attained as this evolutionary trend advanced. This trend reached its natural culmination in the species, *Homo sapiens,* and all present-day peoples are descendants of this large-brained human type. They must possess, therefore, not only common organic needs and desires but also a common set of organic specializations to serve as the means for supplying these basic requirements. In spite of racial differentiation within the species, the general type of cultural order—involving invention, communication, and social habituation—is essentially the same for all. Such differences as exist between individuals, communities, and races are purely quantitative in character. The universal culture pattern thus reflects the morphological, physiological, and behavioral unity of the species.

According to this conception, the primary culture pattern embraces only those general types of adjustment which are essential to human social life at any level of attainment. This pattern determines the major directions that human activities must take since man is the kind of organism that he happens to be. If organic evolution had proceeded along other lines during the pro-human stage, this primary pattern might well have been very different from what it now is. For example, this would surely be true if the pro-human stock had evolved wings along with the other specializations that arose. Imagine the difference in primary pattern had gesture language rather than vocalization turned out to be the primary mode of social communication! As it now stands, the universal culture pattern reflects the general similarity of mankind everywhere as to needs, desires, powers, and capacities. It represents the major lines of invention and artifice which are both possible and necessary to a strictly human existence. It thus becomes the functional equivalent of continued organic specialization, as found in the animal kingdom generally. Although this primary pattern may have been somewhat incomplete for ancient man, it goes back in its broader outlines to the very emergence of culture.

The analysis of Wissler (82) represents the most serious attempt that has been made to delineate the universal culture pattern in concrete terms. He recognizes

nine major classes of culture traits in accordance with the following outline:

1. Speech (languages, writing systems, etc.)
2. Material Traits (food habits, shelter, transportation and travel, utensils, tools, weapons, etc.)
3. Art (carving, painting, drawing, music, etc.)
4. Mythology and Scientific Knowledge
5. Religious Practices (ritualistic forms, treatment of the sick and the dead)
6. Family and Social Systems (marriage, reckoning relationships, inheritance, social control, sports and games)
7. Property (real and personal, standards of value and exchange, trade)
8. Government (political forms, judicial and legal procedures)
9. War

This outline is regarded by Wissler as tentative and was designed primarily as an aid in classifying cultural museum materials. As Ellwood (19) has pointed out, it is open to criticism on the ground that it is extremely arbitrary at various points. It is obvious, for example, that such material traits as tools, weapons, utensils, and the like might well be placed under the head of property. In fact, barter and trade in primitive societies usually center about artifacts of this order. Moreover, it is difficult to see how family inheritance can be adequately considered apart from the domain of property. Numerous other points might be cited to illus-

trate the fact that the classification is unnecessarily arbitrary. Perhaps this is due in large part to the lack of any attempt to connect the culture scheme with the basic needs and traits of mankind. In any case, the emphasis of Wissler upon the concept of the universal culture pattern is strongly to be commended. The principle itself is sound even though the classification offered is faulty and inadequate.

As a matter of fact, it is practically impossible to arrange a strictly natural classification of the basic elements of the cultural order. In the first place, the growth of culture is a cumulative process dependent upon many factors, some of which are more or less ubiquitous. The primary pattern constitutes the universal warp of the cultural web and variable secondary pattern factors the woof. In time, the interpenetration becomes so intimate that the primary pattern is more or less obscured. It is difficult if not impossible to strip the primary pattern of the elaborate overlay of secondary factors in the case of present-day cultures. In the second place, the primary pattern itself represents a genuine unity of manifold complexity. It is a thing of many dimensions and cannot be adequately delineated by a simple model or reduced to a two-way table. Each fundamental type of cultural activity is effectively connected with every other type in the basic societal system. To describe one type completely would involve a

delineation of the entire primary pattern. This means that any attempt to analyze the universal pattern in simple outline form is bound to be more or less arbitrary and inadequate.

These essential limitations have been kept in mind in the formulation of the tentative outline presented in Figure 10. This outline differs from that of Wissler cited above in that it represents an attempt to relate the primary culture pattern to human nature. As a result the analysis of this pattern into classes of cultural activities appears to be much less arbitrary than that of Wissler. A given set of activities is regarded as being motivated primarily by a given need or trait which is common to all mankind. When taken together these needs and traits represent the fundamental demands of man conceived of as a social being. Such traits as are listed need not be regarded as instincts but they are activities which develop naturally under the conditions of normal human life. Whether they are innate or learned is a matter of small consequence so long as their universal character is recognized. The needs and traits as listed represent the biosocial-cultural nexus where the organic and the superorganic make definite contact.

The analysis of human nature, as presented in Figure 10, has been made with special reference to the problem under discussion. It is not intended as a gen-

Human Nature (Needs, Traits)	Classes or Types of Cultural Activities (Primary Pattern Factors)
Food	Gathering, hunting, fishing, herding, agricultural pursuits.
Shelter	Clothing; family domicile; stockades, forts, etc.
Protection	Individual and group methods of attack and defense.
Family	Marriage, care of young; puberty rites; reckoning relationships.
Language	Vocal speech and gestures; writing systems.
Social Forms	Folkways and mores relating to neighborhood, clan, tribe, etc.
Government	Political organization; legal and judicial procedures.
Property	Personal and group property; barter and commerce.
Construction	Tools, weapons, utensils, shelters, means of transport, etc.
Artistry	Ornamentation of the body; carving, painting, drawing, etc.
Curiosity	Magic, mythology, religious beliefs and rites; scientific notions.
Play	Sports, games, dramatic events, music and dances.

Figure 10.—THE UNIVERSAL CULTURE PATTERN

eral psychological treatment of the subject. It stresses the social rather than the individualistic aspects of human nature. The needs and traits as listed are interrelated and hence cannot be thought of as disparate and mutually exclusive entities. Needs and traits have both been included so as to avoid the concept of specific instincts. These have been listed, roughly at least, in the order of their fundamental biological importance. Perhaps, the chief value of such an analysis is to stress the fact that the springs of culture arise within human nature itself. Doubtless this outline of cultural sources will be improved and amplified as more is learned regarding the social impulses of mankind.

The classification of cultural activities shown in Figure 10 necessarily involves overlapping at many points. In fact, each set of activities as listed is connected in some way with every other set. The close connections between clothing and property, folkways and marriage, bodily ornamentation and magic, and numerous other pairs of cultural factors are fairly obvious. Moreover, it should not be supposed that a given set of cultural activities is motivated solely by the need or trait which it follows in the table. Each type of cultural activity is connected in some way with every aspect of human nature. Only the more direct and dominant relationships have been shown by the tabular arrangement. For example, tools are the direct outcome of man's

capacity to construct, but they are also influenced by food-processes, family life, artistry, and other aspects of human nature. As a matter of fact, if all possible inter-relations between the various items had been indicated by lines and arrows, the table would appear as a confused and valueless jumble. In its present simplified form, the outline represents the broader aspects of the universal culture pattern in its proper biosocial setting.

The question may be raised as to whether or not all of the cultural activities listed in the table (Figure 10) are truly universal. The answer to this query must be that each type of activity included is known to be present in some form in even the most primitive cultures of our own day. This is true even of written language, which would appear to be the most questionable item. The outline is acceptable in this respect, therefore, insofar as existing peoples are concerned. It may very well be, however, that a few of the activities listed did not belong to the early culture pattern of *Homo sapiens* or modern man. It seems likely, indeed, that agriculture, commerce, and written language represent the results of secondary patterning. In any case, these several types of activity are directly related to definite human capacities and have now come to attain universal significance.

SECONDARY CULTURE PATTERNS

According to Tylor (69), culture comprises "that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society." It is common knowledge that the traits through which these various aspects of culture are expressed differ markedly in specific pattern from one locality to another. Since the primary pattern is the same for all peoples, the question arises as to how this infinite diversity of social habit has been brought about. This query may be answered briefly by saying that such diversity arises through the mechanism of secondary cultural patterning. The aim of the present section will be to explain and illustrate the workings of this mechanism.

It is important, first of all, to recognize the fact that even the most diverse cultures are much more alike than they are different. As a rule, the similarities are intrinsic and fundamental, whereas the diversities are relatively accidental and superficial. This principle is implicit, of course, in the concept of the universal cultural pattern discussed above. On the side of similarity may be placed the common needs and traits of human nature together with a set of cultural activities that relate directly thereto. The general pattern of these various activities is determined by the function

which each serves in the scheme of human life. It thus appears that the diversities which arise as a result of secondary patterning are largely limited to details. As a matter of fact, this logical deduction is amply corroborated by evidence drawn directly from the analysis and comparison of existing cultures.

Perhaps it will be well to clarify this point by citing a few examples. The use of ornament and clothing is universal, although variations in material, style, color, and such other details are legion. All peoples make use of the hands in eating, even though the specific implements utilized in manipulating the food may vary from chopsticks to the knife and fork. The social sanctions, prerogatives, and obligations of marriage are much the same everywhere in spite of rather marked differences in rites, rules of residence, and certain other externals. Attention has often been called to the general similarity of widely isolated systems of magic, mythology, and religious beliefs. The same may be said of sports, games, and public tribal events. It is small wonder, indeed, that Bastian was led to speak of the "appalling monotony of the fundamental ideas of mankind all over the earth." Perhaps it would be better to say that the primary culture pattern of man is so basic to human needs that secondary patterning appears to be relatively superficial elaboration.

This principle is further exemplified by the universal

trait of vocal language. The primary pattern of language is based upon the nature of man's vocal organs and upon the functions of an audible symbolic system in societal life. This is shown by the fact that any normal human being can acquire, under suitable conditions, the language of any race or people. Moreover, he can then make use of the same as a social instrument. Languages may differ greatly in details of structure and still be broadly similar in grammer and syntax. The greater our knowledge of the basic structure of languages, the more difficult does it become for the linguist to arrange them in a hard and fast classification. In brief, the languages of existing peoples are much more alike than different both as to form and function. It cannot be denied, however, that such differences as exist are weighted with important consequences as cultural barriers. The same may be true as well of the secondary patterning of many other types of cultural activities.

The changes associated with secondary patterning are brought about through the operation of two more or less related processes: invention and diffusion. It is usual to speak of invention when a specific trait or trait-complex has its origin within the group in which it is found. Inventions may represent either individual or group discoveries but the former are by far the more numerous. In any event, the invention does not attain

the status of a cultural trait until it has passed beyond the individual and become an accepted part of group life. Such socialization of inventions may result from imitation, tuition, or the pressure of authority in one form or another. The process of diffusion, as here intended, depends upon the contact of peoples possessing different specific traits. A trait may be directly borrowed, under such circumstances, or it may be forced upon one group by the other. Diffusion is favored by the contacts involved in wars, migrations, and the infiltrations of contiguous peoples. As is well known, certain traits are often widely disseminated by the enterprise of the trader and the traveller. The socialization of borrowed traits occurs in much the same manner as the spread of a new invention within the group.

Invention and diffusion, as cultural processes, are much more closely related than is commonly supposed. The ability to borrow and readily socialize a trait often implies the capacity to make a similar invention. In some cases at least, borrowing means little more than the substitution of one trait for another that is similar to it in most respects. This is well illustrated by instances in which the language or the gods of the conqueror are adopted by the conquered under the pressure of circumstances. The replacement of bronze artifacts by similar ones made of iron is another case

in point. Moreover, even the borrowing of traits involves a certain measure of inventive genius. For borrowed traits are seldom taken over *in toto*. As a rule, they are appreciably modified in order to make them better fit the conditions and requirements of the new group. In brief, the appropriation of culture traits involves invention and creation. This is well illustrated by the way in which the Japanese have taken over and helped to advance Occidental culture within the space of a few decades.

As Dixon (16) has pointed out, borrowed traits may be modified by the new group either in structure or in status. That is, the trait may be changed in pattern or it may occupy a place of greater or of lesser importance in the culture of the borrower. For example, when maize spread from America to Europe it was sowed like wheat at first instead of being planted in hills according to the Indian custom. In adopting horse culture, the plains Indians enlarged the dog *travois*, or drag frame, and hitched the horse thereto, instead of building carts of Spanish style. The change in status of a borrowed trait is exemplified in the spread of agriculture from the Pueblo tribes to the Indians of southern California. This trait was a fundamental part of Pueblo culture but always remained a subordinate element of the culture pattern of the neighboring tribes which adopted it. The changes which arise in connec-

tion with the diffusion of traits may usually be explained as inventive adjustments to the specific needs, customs, and environmental opportunities and limitations of the borrowing group. In rare instances, a trait may be so modified in fitting it into a new cultural pattern as to become almost unrecognizable in time.

The question has often been raised as to the relative importance of invention and diffusion in the evolution of culture. This query must remain unanswered until our knowledge of past cultural processes is much broader as well as more intensive than it now is. The source of most culture traits, except those of comparatively recent origin, cannot be definitely determined. The same is true of the spread of traits by diffusion. In relatively few instances can the route of diffusion be more than sketchily traced with any degree of assurance. Moreover, it should be clear that the relative importance of invention and diffusion is a function of time, place, and circumstance. In the distant past, the isolation of peoples favored invention within the group rather than diffusion from group to group. The independent origin of similar if not practically identical traits would be likely to occur because of the dominant universal culture pattern. As contact between peoples became more common and regular through migrations, wars, and infiltrations, the importance of diffusion gradually increased. Doubtless, diffusion is a greater influ-

ence today than is independent invention, since knowledge can be so readily communicated from one cultural area to another.

In view of these facts and principles, the controversy that has long raged between the anti-diffusionist and diffusionist schools would seem to be futile and absurd. The former school holds that most culture traits represent inventions within the group rather than borrowings from without. Independent origins are insisted upon for identical traits even in cultures that are so contiguous that diffusion could easily have been possible. This position is greatly weakened because of the lack of direct historical evidence relating to the origin of traits. The extreme diffusionists hold that each trait was invented only once and then spread by some means to all other groups in which it is later found. This doctrine is well represented in the writings of Graebner (26) and Elliot Smith (62, 64). The latter has sought to prove that human culture traits originated in Egypt and were carried to other lands by migrating bands of this superior race. Even the culture traits of peoples in such distant lands as Asia and America are presumed to be the result of this widespread diffusion process. He regards megalithic monuments and other evidences of sun worship as the signposts along the route of this cultural dispersion. The fanciful theory of Smith has been ably criticized by Dixon (16) and others.

When properly understood, the concepts of independent origins and diffusion are complementary rather than antagonistic. The diffusion of culture traits at the present time can readily be observed by anyone. Moreover, it can scarcely be doubted that diffusion has played an important rôle in the past. But diffusion can hardly account for the presence of the "bull-roarer" complex in such widely disconnected areas as Australia, Melanesia, Central Africa, and Brazil. The same may be said of totemism in Australia and North America. There are natural limitations to the spread of culture by diffusion. Furthermore, it is absurd to deny that a given trait may be invented independently by different peoples. The presence of the universal culture pattern renders such multiple invention highly probable. Moreover, independent invention is common enough in present-day life. Ogburn (56) has listed 148 discoveries which are known to have been made by two or more persons in recent times. The truth seems to be that independent invention and diffusion have always operated together in the larger process of cultural evolution.

It is impossible at present to explain the trends set up during the process of secondary patterning by a definite set of principles. The notion of Tylor (69) that each culture must of necessity pass through the same series of stages has long since been discarded. It is now recognized that the trend for any given culture

as a whole is dependent upon chance invention, historical accident, and the opportunities and limitations of the specific environment. The same principle applies to trends associated with the elaboration of specific traits. There is no reason to assume, as does Briffault (10), that the matriarchal form of social structure uniformly preceded the patriarchal. The secondary patterning of family life and social organization has clearly followed different trends in various cultures. As Boas has said, man tends to beautify, but this does not mean that art forms have passed through the same progressive series of stages among all peoples. In brief, cultural evolution in general and in particular is a process of many and diverse trends. Like biological evolution, it is far from being unilinear in direction. Perhaps, the growth of culture is best represented by a great tree, the trunk standing for the primary pattern and the branches for the divergent results of secondary elaboration.

Chapter V

CULTURE AND PROGRESS

It is commonly taken for granted, at the present time, that further cultural evolution means continued social progress for mankind. This notion rests upon the *a priori* assumption that the forces of civilization are steadily moving toward a state of ultimate perfection. This spirit of naïve optimism is shared alike by the social philosopher and the man in the street. Indeed, the dogma of inevitable social progress has now become the controlling idea of Western civilization. It is scarcely called in question even by those who may profess, from time to time, to see signs of danger upon the social horizon. Such dangers are usually interpreted to mean that the rate of progress may be somewhat retarded; that the goal of perfection lies further ahead than had been supposed. The prophets remind us that the road of evolutionary advance is rough and thorny; that the course of progress is likely to be irregular and cyclic rather than unilinear. The abiding faith persists that human intelligence will surmount all difficulties that arise and bring to ultimate realization

the manifest destiny of the race. In brief, the optimistic dogma of social progress is the prevailing and unquestioned credo of the times.

Nevertheless, it is worthy of note that the doctrine of social progress is of relatively recent origin. According to Bury (11), the concept itself was not fully expanded until about the close of the seventeenth century, and attracted little notice up to the time of the French Revolution. The idea came into its own, as an accepted and obvious principle, in connection with the development of the Darwinian theory in biology. Darwin held that natural selection operated in the social as well as the corporeal realm. In spite of his emphasis upon chance in evolution, he hinted that natural selection induced a tendency "to progress towards perfection." The survival of the fittest thus meant, in the long run, the survival of the best. Spencer did much to popularize the doctrine of progress in his treatises on sociology and ethics. To him, evil was not a permanent necessity but a temporary non-adjustment of the organism to new social conditions. Civilization, as a part of nature, must remedy this non-adjustment as social integration advanced. The ultimate purpose of creation, he held, is to produce the greatest amount of happiness for mankind; the final goal of life is social perfection.

It is apparent that these early writers rested their case upon a flimsy and questionable analogy. They

were unduly impressed by the superficial similarities that exist between organic and cultural evolution. They did not clearly perceive that the process of cultural evolution is quite distinct from that of organic evolution. As we have noted, the latter involves the mechanism of germinal variations and natural selection. It proceeds slowly by bringing about permanent changes in the structural and functional characteristics of the type. Cultural evolution, on the other hand, rests upon the mechanism of invention, communication, and social habituation. It should be obvious that this essential distinction renders the argument from analogy utterly absurd. That which has occurred in the biological order can give us no clue whatsoever as to what may happen in the cultural order. The emergence of culture meant the setting up of genuinely new processes and trends in a new realm of being.

These early writers, moreover, did not properly interpret the doctrine of organic evolution. As Bury (11) has pointed out, evolution is a neutral concept and is thus equally compatible with either optimism or pessimism. Natural selection induces organic trends but with no guarantee whatever that such trends will result in a series of organic types of a progressively higher grade. It is well known, indeed, that most organic trends are eventually carried too far and lead to the extinction of the type. It is an axiom of evolutionary

biology that such types as now exist will eventually be either destroyed by natural selection or merged into a new type as time goes on. The basis of value in evolution is survival, not organic perfection. An existing parasite, although degenerate, is "better" than an extinct race of men, so far as Darwinism is concerned. Evolution means change in some direction but not necessarily upward. Even the trend toward an increase in complexity and differentiation of bodily structure often turns out to be a fatal handicap in the long run. In view of Darwin's emphasis upon fortuity in evolution, it seems likely that the notion of a tendency "to progress towards perfection" was suggested by him merely to make his general doctrine more palatable.

However this may be, the doctrine of inevitable social progress lies ahead but at best this can be regarded only as a probability. A continuous upward trend subjected to the most severe scrutiny. It may be that social progress lies ahead but at best this can be regarded only as a probability. A continuous upward trend is by no means certain and inevitable. An optimistic interpretation of the course of civilization, if true, must be drawn from relevant facts rather than postulated as an axiom. Moreover, one may reject this dogma, on logical grounds, without thereby proclaiming himself a prophet of doom. To deny the notion of inevitability is merely to open the problem of progress to scientific

investigation. It is simply to insist that the outlook for man and culture must be examined in the light of the concrete forces and trends that are found to be operating. The question of pessimism or optimism must be answered by the facts and principles that grow out of such an empirical analysis. On account of the importance of the dogma of social progress to current social theory, it seems best to offer a brief critique of its basic assumptions in the following section.

THE DOGMA OF SOCIAL PROGRESS

Strangely enough, the doctrine of inevitable social progress strikes one as a simple and obvious proposition at first glance. On closer examination, however, the underlying implications are seen to be both complex and far-reaching. These implications are so tenuous and vague that they are apt to pass unnoticed unless specifically pointed out. Once clearly understood, the absurdity of the doctrine becomes immediately apparent. In the present brief treatment, it will be convenient to organize the discussion around the three following topics: (a) the concept of social good, (b) the basic factors which make for social good, and (c) the nature of cultural trends. These several topics will be taken up in the order indicated.

In order to put the dogma to the test, it is necessary to come to an agreement as to the meaning of the term

"good" as applied to human social life. Unfortunately, the social philosophers have failed to develop, up to the present, a strictly logical definition of social good. Nor have they offered us a valid and acceptable criterion of social progress. Such formulations as have been devised are not only woefully vague but usually reflect narrow doctrinaire prejudices. For example, the economist Adam Smith was thinking of material prosperity when he coined his famous phrase, "the greatest good to the greatest number." But surely economic security is only one aspect of social good. What about individual freedom and happiness? What about the inter-relationships of the various cultures of a period within the general world order? It should be borne in mind that the concept of human social progress refers to the advance of civilization as a whole rather than simply to improvement within a particular culture.

In the absence of a scientific definition of the socially good, it seems necessary to appeal to the common-sense judgment of mankind. Consensus of opinion is not always a safe guide, but it would seem to be reasonably trustworthy in the present instance. Perhaps, most of us would be willing to agree that civilization is to be judged by the adequacy with which it ministers to "the health, wealth, and happiness of mankind." This phrase of H. G. Wells explicitly recognizes the biological, economic, and personal aspects of social value.

It is somewhat less vague than most formulations intended to cover the point at issue, and possesses the distinct merit of breadth of scope. It is obvious that the concrete conditions which make for health, wealth, and happiness vary greatly from one cultural level to another. The same would be true, however, with respect to other sets of terms which might be used to express social value. In any case, we may adopt this conception of social good as being sufficiently sound and precise for our present purpose.

The question may now be raised as to the nature of the basic factors which make for social good. In order to determine these in the concrete, it would be necessary to make a complete analysis of effective cultural forces. The number would be legion and the task would be both arduous and fruitless. Our interest at this point is limited to a search for the general sources of effective factors. On this basis, such factors fall naturally into two broad classes: (a) human nature, and (b) cultural conditions. Social good is influenced by the needs, wants, and capacities of man, on the one hand, and by the status of the cultural order on the other. In general, it may be said that a high index of social good depends upon a proper balance between human nature and cultural status. The health, wealth, and happiness of mankind at any period is a function of the degree of harmony existing between the ends of

life and the social means at hand. Indeed, progress might well be defined as the tendency for this index of harmony and balance to approach the optimum value. Such a condition would be possible only when a convergent trend exists between man's capacity and aptitude for culture, on the one hand, and the growing complexity of the cultural order on the other.

Unfortunately, there appears to be no evidence for the existence of such a general trend. In fact, man and culture seem to be diverging rather than converging. Perhaps it would be better to say that the cultural order is tending toward greater and greater complexity, whereas human nature remains stationary. Moreover, the pace of cultural elaboration is now exceedingly rapid in the great centers of civilization. Nor can it be denied that the more elaborate secondary patterning becomes, the further it diverges from the primary and intrinsic demands of human nature. It seems fairly obvious that the law of diminishing returns directly applies to cultural elaboration. When carried beyond a certain point, further refinements of civilization are likely to add less and less to human happiness. In time, the advantages conferred tend to be offset by disharmony and by actual conflict between human nature and social demands. The logical conclusion is that human happiness steadily decreases as cultural complexity approaches a maximum. It is difficult to

see, therefore, how social progress—in terms of the health, wealth, and happiness of mankind—is to be expected on the basis of present trends.

Perhaps, the static character of human nature constitutes the chief handicap to social progress. It is generally admitted that man has changed in no fundamental aspect since the coming of *Homo sapiens*. The bodily specializations which are of basic utility in cultural processes had then been completed. The evolution of further capacity for culture would be so slow, even if it were taking place, that it could not keep pace with the changes which occur under civilization. The truth seems to be that modern man still possesses the brute instincts of his anthropoid and pro-human forbears. These strong intrinsic urges are forever in conflict with the forces of social control which he has created. Open revolt is prevented only by virtue of the long period of social habituation during individual development. And, since human nature is now static, each individual must begin this period of adjustment at a common zero point. The antagonism between human nature and the social order is still strong enough in the adult to require the presence of a stringent legal and judicial system. All this may be admitted, however, without agreeing with Rousseau that civilization is an unmixed evil. Our purpose is merely to show that secondary patterning is not necessarily an

unmixed good—that it can quite conceivably be carried too far.

The essential conflict between human urges and social proscriptions seems likely to become sharper and sharper as the complexity of civilization increases. The burden of civilization may also be expected to increase with such a trend. This point is usually overlooked by those who regard complexity alone as the infallible sign of progress. It is true that civilization eases many burdens but this is often accomplished by the addition of others equally irksome. There is always the danger that the demands of complexity will increase faster than the satisfactions that ensue. This is especially the case as secondary patterning becomes farther and farther removed from the basic needs and traits of human nature. Moreover, this principle applies to the group as well as to the individual. It is surely a far cry from the simple social life of primitive man to the intricate societal pattern of modern civilization. It is certainly an open question whether a further increase in intricacy will contribute measurably to the health, wealth, and happiness of mankind. The fact must be faced that cultural advance means the creation of a social régime that is less and less in accord with man's natural capacities and temperament. This in itself would seem to weight the odds rather heavily against continuous and unlimited progress.

The final topic, relating to the nature of cultural trends, can be dismissed rather briefly. We are chiefly concerned with the question of the stability and permanence of such trends. Does the history of civilization justify the belief that the future course of cultural processes can be predicted? Have we any real ground of assurance that the present trend toward an increase in the complexity of civilization will continue indefinitely? Both of these questions must be answered in the negative. It is common knowledge that all great civilizations of the past have disintegrated after reaching a certain level of complexity. The civilizations of today represent a higher level of complexity than those of the past, but this fact proves nothing as regards the future. According to Spengler (65), Western civilization, as the focal point of general cultural advance, has already begun to decline. For all we know, there may be a definite limit to man's capacity to invent complex cultural systems. When this point is reached, stagnation and decline must follow. The possibility of such a limit seems plausible in view of the static character of human nature. But the dogma of inevitable social progress explicitly assumes that cultural elaboration and integration will continue indefinitely.

The concept of cultural cycles has often been merged with the doctrine of progress in order to make it appear more plausible. The general advance of culture is

admittedly attended by irregularities represented by divergent trends of various sorts. The assumption is made that these irregularities are of such an order as to cancel out one another in the great onward sweep of time. But this too is mere assumption. It is doubtless true that certain types of societal trends are self-correcting in the long run. Feudalism was followed by a strong trend toward democracy. The authoritarianism of the Middle Ages was followed by the revival of learning. But such illustrations do not prove that all cultural trends which diverge from the main line of advance are self-correcting. It would be easy to show, for example, that the trend toward war has shown no serious signs of abating as yet. The same may be said concerning the tendency to violence and crime. Finally, the momentum of cultural change which began with the machine age certainly shows no signs of decrement as yet. Numerous other examples of apparently non-correcting trends might readily be cited. The truth seems to be that culture trends are so much the sport of unforeseen accident that generalization is impossible and prophecy mere idle talk.

The proponents of the dogma of social progress have overlooked the possibility that the increasing momentum of the cultural advance might well become a source of danger. The establishment of individual and social adjustments to change often requires a considerable

time. But suppose the rate of advance becomes greater than man's adjustment capacity can bear? Might not this lead to a complete disruption of the pattern of civilization? Indeed, it is conceivable that human genius might create a cultural machine so complex that man could no longer control it—a literal social Frankenstein. Once this monster got out of hand, human civilization could be destroyed and the remnants of mankind reduced to primitive barbarism. The deciding event might well be a world-wide war of sufficient duration to involve the destruction of the best brains and brawn of the race. In such a case, the end of man's cultural advance might be permanent. Such a fate may not be highly probable but it is surely possible. So long as such cultural upheavals are even remotely possible, the notion of an inevitable upward trend must be regarded as purely speculative.

In the light of the above criticism, the dogma of social progress appears to be no more than a pretentious absurdity. The confused logic offered in its support suggests that it is merely the rationalization of an urgent human wish. The general desire for social progress makes it easy for mankind to believe that such is inevitable. The dogma is clearly an article of faith rather than a scientific principle. It is a source of great danger because it fosters a naïve optimism by giving the illusion of general social security for the future. It

leaves the basic problem of safety and progress to a supposedly benign fate. It means the doctrine of *laissez-faire* in the realm of social relations. This is dangerous because the facts of life point so clearly to the contrary. Cultural processes must be guided by human intelligence if the future good of the race is to be realized. Genuine progress is assured only if man is willing and able to accept the full responsibilities of complete social control.

THE CULTURAL OUTLOOK

If the viewpoint just expressed be accepted, it becomes highly imperative that the fundamental trends in modern civilization be adequately understood. Knowledge is the first step in social control—to be forewarned is to be forearmed. The task of measuring societal forces and evaluating cultural trends properly belongs to the sociologists. Even a partial survey, corresponding to our present state of knowledge, would require volumes of tabular material and manifold comparisons. The most that can be done, in the present brief section, is to note and roughly evaluate a few of the more outstanding trends of the times. In many cases, the significance of such trends for the common good is fairly apparent. When taken together, these give us some notion of the general direction in which the higher civilizations are moving. Indeed, if we

assume that present trends will continue for a time, the immediate outlook can be roughly sketched. The possibility that some of these social movements may shift in either force or direction should not be ignored in attempting to interpret their significance for the future.

As a matter of convenience, the several trends to be examined may be roughly grouped with reference to their bearings upon the social good. As we have seen, the latter is concerned with the health, the wealth, and the happiness of mankind. It is true, of course, that these three aspects of social good cannot be rigidly separated. Moreover, the trends themselves are usually overlapping in their influence because of their close inter-connection. Nevertheless, health, wealth, and happiness do represent fairly distinct aspects of the common good, and hence will serve as convenient points of emphasis. Furthermore, certain trends are of greater significance to one of these fields of good than to another. Perhaps the general scope of the three terms should be indicated at this point. By health, we mean not merely bodily functions but also genetic constitution and other biological factors. International as well as local economic conditions may readily be included under the category of wealth. The term happiness is used to cover the more strictly personal aspects of societal life. It is obvious, of course, that matters of health and wealth are of great significance to human

happiness. Nevertheless there are certain less tangible factors which are even more intimately related to human happiness.

In the first category may be placed the trend toward a more restricted and sedentary life as modern civilization increases in complexity. This tendency has increased in momentum as the peoples of rural communities have crowded into the cities in the wake of the machine and the lure of white-collar employment. If we assume that this trend will continue, it is pertinent to inquire whether or not it will lead to the physical deterioration of the race. It has already brought about a marked increase in occupational and epidemic diseases in spite of increased medical skill and improved sanitation. It seems quite unlikely, however, that these conditions have been present long enough to impair seriously the physical constitution of the race. Brawn from the rural districts is continuously pouring into the cities so that it is difficult to measure the effects of a sedentary existence. Perhaps if city children were reared in the country they would be as strong and virile as were their remote rural forbears. No one can predict what will happen, however, if this trend increases its pace and continues long enough. Nature has a way of reducing or eliminating, in certain cases at least, organs that no longer serve a useful function.

Perhaps the most serious aspect of extreme urbaniza-

tion is the increasing trend toward a low birth rate as a civilization becomes older and more complex. The large family may be an asset under rural conditions but it is a decided handicap to the cosmopolite. High rents and limited living quarters combine with the sophistication and glamour of city life to reduce the birth rate. The substitution of the machine for farm labor has fostered a trend in the same direction in many rural communities. Doubtless there are numerous accessory causes working to reduce the birth rate in older civilizations. In any case, the population of Spain, France, and other European countries has already become practically stationary, and a like condition in America seems to be only a matter of time. A stationary or declining birth rate may not be a social evil but in the past it has usually marked the passing of political and cultural supremacy.

The eugenics movement has attracted attention to the fact that civilization induces a differential birth rate in favor of the less desirable strains in the general population. Apparently, it is the most capable and intelligent people of the community who produce the fewest children. Since intelligence is hereditary, this means a progressive weighting of the odds against the preservation of a high average genetic constitution. This trend is clearly a genuine source of danger insofar as it represents an increase in the number of mental

defectives and insane. It should be noted that the opportunities for survival and propagation in modern society are distinctly favorable to weaklings. It is contrary to our ideals to permit the principle of the survival of the fittest to operate freely, as happens in the biosocial realm. Mental and physical defectives are protected, cared for, and often allowed to propagate freely. As Landman (45) has shown, sterilization laws usually apply to only the extremely unfit and their operation is often hampered by the sentimentalism of the populace. If such conditions continue long enough, the genetic constitution of the race will certainly be considerably lowered. The priceless heritage of man, once it is lost, can never be regained.

One constant source of danger to the social health of mankind is the trend for war to increase in frequency and intensity as civilization becomes more complex. The development of political integration and imperialistic expansion has seemed to depend in large measure upon warfare. Moreover, the normal evolution of international socio-economic relations has tended to enlarge the scope of war to world-wide proportions. Since this evolution is likely to continue as the natural outcome of rapid communication and exchange, the outlook is for wars to increase in frequency, intensity, and scope. This seems to be almost a certainty, indeed, unless an acceptable formula for preventing war among

all civilized peoples is found. The efforts that have been made in this direction up to the present have clearly proved impracticable and abortive. The mechanized armies and navies of today are recognized as mighty instruments operated on the principle of mass slaughter. Aside from the moral issues involved, modern warfare imposes heavy economic burdens upon nations because of the cost of mechanization for attack by land, sea, and air. The chief argument against it, however, is that it is seriously dysgenic. The mass slaughter of select youths means the deliberate elimination of the fit and the survival of the unfit. If this process is carried far enough, it will lead inevitably to the lowering of the genetic constitution of the race.

The status of mankind as regards wealth seems to depend largely upon the steady trend toward technological supremacy as civilization increases in complexity. The ideal of scientific control has become the religion of industry and business with all their many ramifications. Apparently, the machine age and efficient mass production are still in their infancy. For example, agriculture now makes use of only the cruder forms of technology, as represented by mechanization. As chemical techniques advance, solutions in the laboratory should replace the soil, and in time artificial synthesis should be substituted for the growth process itself. If present experiments in this direction are suc-

cessful on a large scale, both the farm and the farmer will be eliminated for all time. Equally disturbing technological developments may lie ahead in numerous other fields. If such changes come about slowly enough, perhaps solutions can be found for the dislocations of workers which are involved. However, it is clear that the supremacy of technology means a permanent reduction in the amount of personal labor required to supply goods to mankind. The result will be fewer workers, shorter hours for the total number of workers, or the use of more goods per capita by the masses. The economic and social consequences of this dominant technological trend must depend upon the kind of solution adopted.

This dominant trend seems likely to continue because it represents the natural tendency of man to control and refashion his environment. Technology has conferred a rich assortment of material benefits upon the human race and should continue to do so. It has also created a number of social problems of major magnitude. We have already noted the possibility of large-scale unemployment as one field after another is taken over and developed. Surely the contribution of technology to modern warfare can hardly be regarded as a social good. Furthermore, large-scale production has had the effect of fostering an undue concentration of power and wealth. The lion's share of the profits of

mass industry has been retained by the capitalist rather than distributed to the workers and to the people at large. This accounts in part at least for the paradox of present-day civilization—starving and needy masses in a world of plenty. The success of technology itself insures plenty, and this should mean economic security for all mankind. The advance of industrial efficiency must thus be regarded as a potential social good. It becomes a danger only when no solution is at hand for the sociological problems which inevitably follow in its wake. Perhaps it is fair to ask whether or not mankind is capable of inventing the social organization that is required to keep pace with the general technological advance.

It now remains to examine such current trends as bear directly upon the happiness of mankind, in the restricted sense here intended. These relate to such important but intangible factors as individual freedom, self-development, and cultural enjoyment. It is in this realm of personal relations that individual and social good become identical. For the proper aim of the societal order, in the last analysis, is to provide the optimum conditions for the freedom, development, and enjoyment of the individual. It is pertinent to ask whether or not this aim has been helped or hindered by the growing complexity of civilization. It seems unlikely that this query can be given a definite and convincing

answer at our present stage of knowledge. Some trends point to progress whereas others point contrariwise. For example, the scope of individual freedom has gradually narrowed as numerous rights and powers have been taken over by the social order. In many cases, however, this has meant merely the release from responsibilities and duties which could be best performed through the medium of group control. It seems to be true, however, that as civilization becomes complex it tends to encroach more and more upon the domain of individual freedom. Perhaps, regimentation is essential to a high order of social integration. If this be true, then there appears to be some danger that the freedom of the individual may be sacrificed in the interests of social efficiency.

It must be admitted that the growth of civilization has greatly enlarged man's opportunities for self-development and enjoyment. The facilities for formal and informal education have steadily increased and the arts which minister to human enjoyment have forged ahead. In fact, the good things of life—whether material, intellectual, or emotional—now abound on every hand. These fruits of civilization are recognized as essential to a high standard of living. The urge to attain the things of cultural worth has become the ruling passion of the age. Apparently the pace of living will continue to increase as civilization grows more complex. At the

risk of seeming impertinent, one may ask whether the swift pace of modern life is altogether consistent with genuine self-development and enjoyment. In simpler times, the leisure for social contacts, hobbies, and contemplation were commonly regarded as essential to human happiness. Is the quickened pace of today worth the catch? It must be evident, indeed, that the choice fruits of civilization that abound are well beyond the reach of the average man, who has neither economic sufficiency nor leisure. The ceaseless struggle for the unattainable good may prove to be worse than futile in the end by breeding discontent and pessimism. The inspiration to achieve and possess is worthy, but it may become a disintegrative social force if carried to excess.

In conclusion, it may be said that our survey of current trends offers no support to the doctrine of a manifest racial destiny. The inventive genius of man created civilization and his highest social intelligence must guide it continually if it is not eventually to run amuck. It is imperative, moreover, that the ideology and methods of guidance change in such wise as to keep pace with an advancing material civilization. The pressing need of the times is for large-scale engineering in the field of social control, with direct reference to the health, wealth, and happiness of mankind. The scope of such deliberate planning must be international because the forces and trends of modern civilization

have taken on a world-wide significance. The economic and social balance of one nation is dependent upon the maintenance of balance in all others. Rapid means of communication and transport are gradually merging into one the several civilizations of today. Clearly, then, the situation calls for the intelligent planning of a world-wide economic and social order.

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