

ANTHROPOLOGY

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I. SCOPE OF THE SCIENCE.

Anthropology (the *science of man*, $\alpha\nu\text{-}\theta\rho\omega\pi\omicron\varsigma$, $\lambda\omicron\gamma\omicron\varsigma$) denotes the natural history of mankind. In the general classification of knowledge it stands as the highest section of zoology or the science of animals, itself the highest section of biology or the science of living beings. To anthropology contribute various sciences, which hold their own independent places in the field of knowledge. Thus anatomy and physiology display the structure and functions of the human body, while psychology investigates the operations of the human mind. Philology deals with the general principles of language, as well as with the relations between the languages of particular races and nations. Ethics or moral science treats of man's duty or rules of conduct toward his fellow men. Lastly, under the names of sociology and the science of culture, are considered the origin and development of arts and sciences, opinions, beliefs, customs, laws, and institutions generally among mankind, their course in time being partly marked out by the direct record of history, while beyond the historical audit our information is continued by inferences from relics of early ages and remote districts, to interpret which is the task of præ-historic archæology and geology. Not only are these various sciences concerned largely with man, but several among them have in fact suffered by the almost entire exclusion of other animals from their scheme. It is undoubted that comparative anatomy and physiology, by treating the human species as one member of a long series of related organisms, have gained a higher and more perfect understanding of man himself and his place in the universe than could have been gained by the narrowed investigation of his species by and for itself. It is to be regretted that hitherto certain other sciences - psychology,

ethics, and even philology and sociology - have so little followed so profitable an example. No doubt the phenomena of intellect appear in vastly higher and more complete organization in man than in beings below him in the scale of nature, that beasts and birds only attain to language in its lower rudiments, and that only the germs of moral tendency and social law are discernible among the lower animals. Yet though the mental and moral interval between man and the [2] nearest animals may be vast, the break is not absolute, and the investigation of the laws of reason and instinct throughout the zoological system, which is already casting some scattered rays of light on the study of man's highest organization, may be destined henceforth to throw brighter illumination into its very recesses. Now this condition of things, as well as the accepted order in which the sciences have arranged themselves by their mode of growth, make it desirable that anthropology should not too ambitiously strive to include within itself the sciences which provide so much of its wealth, but that each science should pursue its own subject through the whole range of living beings, rendering to anthropology an account of so much of its results as concerns man. Such results it is the office of anthropology to collect and co-ordinate, so as to elaborate as completely as may be the synopsis of man's whole bodily and mental nature, and the theory of his whole course of life and action from his first appearance on earth. As will be seen from the following summary, the information to be thus brought together from contributing sciences is widely different both in accuracy and in soundness. While much of the descriptive detail is already clear and well filled in, the general principles of its order are still but vaguely to be discerned, and as our view quits the comparatively distinct region near ourselves, the prospect fades more and more into the dimness of conjecture.

II. MAN'S PLACE IN NATURE.

It is now more than thirty years since Dr. Prichard, who perhaps of all others merits the title of founder of modern anthropology, stated in the following forcible passage, which opens his *Natural History of Man*, the closeness of man's physical relation to the lower animals:-

"The organized world presents no contrasts and resemblances more remarkable than those which we discover on comparing mankind with the inferior tribes. That creatures should exist so nearly approaching to each other in all the particulars of their physical structure, and yet differing so immeasurably in their endowments and capabilities, would be a fact hard to believe, if it were not manifest to our observation. The differences are everywhere striking: the resemblances are less obvious in the fullness of their extent, and they are never contemplated without wonder by those who, in the study of anatomy and physiology, are first made aware how [...] man in his physical constitution to [.....]. In all the principles of his internal structure, in the composition and functions of his parts, man is but an animal. The lord of the earth, who contemplates the eternal order of the universe, and aspires to communion with its invisible Maker, is a being composed of the same materials, and framed on the same principles, as the creatures which he has tamed to be the servile instruments of his will, or slaves for his daily food. The points of resemblance are innumerable; they extend to the most recondite arrangements of that mechanism which maintains instrumentally the physical life of the body, which brings forward its early development and admits, after a given period, its decay, and by means of which is prepared a succession of similar beings destined to perpetrate the race."

It is admitted that the higher apes come nearest to man in bodily formation, and that it is essential to determine their zoological resemblances and differences as a step toward ascertaining their absolute relation in nature. "At this point," writes Professor Owen in a paper on the "Osteology of the Apes," "every deviation from the human structure indicates with precision its real peculiarities, and we then possess the true means of appreciating those modifications by which a material organism is especially adapted to become the seat and instrument of a rational and responsible soul." (On the "Osteology of the Chimpanzee and Orang Utan," in *Proc. Zool. Soc.*, vol. i.) Professor Huxley, in his *Man's Place in Nature*, comparing mammalia, decides "There would remain then but one order for comparison, that of the Apes (using that word in

its broadest sense), and the question for discussion would narrow itself to this - is Man so different from any of these Apes that he must form a different order by himself? Or does he differ less from them than they differ from one another, and hence must take his place in the same order with them?" This anatomist states the anatomical relations between man and ape in untechnical terms suited to the present purpose, and which would be in great measure accepted by zoologists and anthropologists, whether agreeing or not with his ulterior views. The relations are most readily stated in comparison with the gorilla, as on the whole the most anthropomorphous ape. In the general proportions of the body and limbs there is a marked difference between the gorilla and man, which at once strikes the eye. The gorilla's brain-case is smaller, its trunk larger, its lower limbs shorter, its upper limbs longer in proportion than those of a man. The differences between a gorilla's skull and a man's are truly immense. In the gorilla, the face, formed largely by the massive jaw-bones, predominates over the brain-case or cranium; in the man these proportions are reversed. In man the occipital foramen, through which passes the spinal cord, is placed just behind the centre of the base of the skull, which is thus evenly balanced in the erect posture, whereas the gorilla, which goes habitually on all fours, and whose skull is inclined forward, in accordance with this posture has a foramen further back. In man the surface of the skull is comparatively smooth, and the browridges project but little, while in the gorilla these ridges overhang the cavernous orbits like penthouse roofs. The absolute capacity of the cranium of the gorilla is far less than that of man; the smallest adult human cranium measuring less than 63 cubic inches, while the largest gorilla cranium measured had a content of only 34½ cubic inches. The large proportional size of the facial bones, and the great projection of the jaws, confer on the gorilla's skull its small facial angle and brutal character, while its teeth differ from man's in relative size and number of fangs. Comparing the lengths of the extremities, it is seen that the gorilla's arm is of enormous length, in fact about one-sixth longer than the spine, whereas a man's arm is one-fifth shorter than the spine; both hand and foot are proportionally much longer in the gorilla than in man; the leg does not so much differ. The vertebral column of the gorilla differs from that of man in its curvature and other characters, as also does the

conformation of its narrow pelvis. The hand of the gorilla corresponds essentially as to bones and muscles with that of man, but is clumsier and heavier; its thumb is "opposable" like a human thumb, that is, it can easily meet with its extremity the extremities of the other fingers, thus possessing a character which does much to make the human hand so admirable an instrument; but the gorilla's thumb is proportionately shorter than man's. The foot of the higher apes, though often spoken of as a hand, is anatomically not such, but a prehensile foot. It is argued by Professor Owen and others that the position of the great toe converts the foot of the higher apes into a hand, an extremely important distinction from man; but against this Professor Huxley maintains that it has the characteristic structure of a foot, with a very movable great toe. The external unlikeness of the apes to man depends much on their hairiness, but this and some other characteristics have no great zoological value. No doubt the difference between man and the apes depends, of all things, on the relative size and organization of the brain. While similar as to their general arrangement to the human brain, those of the higher apes, such as the chimpanzee, are much less complex in their convolutions, as well as much less both in absolute and relative weight - the weight of a gorilla's brain hardly exceeding 20 ounces and a man's brain hardly weighing less than 32 ounces, although the gorilla is considerably the larger animal of the two.

These anatomical distinctions are undoubtedly of great moment, and it is an interesting question whether they suffice to place man in a zoological order by himself. It is plain that some eminent zoologists, regarding man as absolutely differing as to mind and spirit from any other animal, have had their discrimination of mere bodily differences unconsciously sharpened, and have been led to give differences, such as in the brain or even the foot of apes and man, somewhat more importance than if they had merely distinguished two species of apes. Among the present generation of naturalists, however, there is an evident tendency to fall in with the opinion, that the anatomical differences which separate the gorilla or chimpanzee from man are in some respects less than those which separate these man-like apes from apes lower in the scale. Yet naturalists agree to class both the higher and the lower apes in the same order. This is Professor Huxley's argument, some prominent points of which are the following: - As regards

the proportion of the limbs, the hylobates or gibbon is as much longer in the arms than the gorilla as the gorilla is than the man, while on the other hand, it is much longer in the legs than the man as the man is than the gorilla. As to the vertebral column and pelvis, the lower apes differ from the gorilla as much as or more than, it differs from man. As to the capacity of the cranium, men differ from one another so extremely that the largest known human skull holds nearly twice the measure of the smallest, a larger proportion than that in which man surpasses the gorilla; while, with proper allowance for difference of size of the various species, it appears that some of the lower apes fall nearly as much below the higher apes. The projection of the muzzle, which gives the character of brutality to the gorilla as distinguished from the man, is yet further exaggerated in the lemurs, as is also the backward position of the occipital foramen. In characters of such importance as the structure of the hand and foot, the lower apes diverge extremely from the gorilla; thus the thumb ceases to be opposable in the American monkeys, and in the marmosets is directed forward, and armed with a curved claw like the other digits, the great toe in these latter being insignificant in proportion. The same argument can be extended to other points of anatomical structure, and, what is of more consequence, it appears true of the brain. A series of the apes, arranged from lower to higher orders, shows gradations from a brain little higher than that of a rat, to a brain like a small and imperfect imitation of a man's; and the greatest structural break in the series lies not between man and the man-like apes, but between the apes and monkeys on one side, and the lemurs on the other. On these grounds Professor Huxley, restoring in principle the Linnean classification, desires to include man in the order of *Primates*. This order he divides into seven families: first, the *Anthropini*, consisting of man only; second, the *Catarhini*, or Old World apes; third, the *Platyrrhini*, all New World apes, except the marmosets; fourth, the *Arctopithecini*, or marmosets; fifth, the *Lemurini*, or lemurs; sixth and seventh, the *Cheiromyini* and *Galeopithecini*. It seems likely that, so far as naturalists are disposed to class man with other animals on purely zoological grounds, some such classification as this may, in the present state of comparative anatomy, be generally adopted.

It is in assigning to man his place in nature on psychological grounds that the greater

difficulty comes into view. The same naturalist, whose argument has just been summarized against an absolute structural line of demarcation between man and the creatures next in the scale, readily acknowledges an immeasurable and practically infinite divergence, ending in the present enormous gulf between [5] the family of apes and the family of man. To account for this intellectual chasm as possibly due to some minor structural difference, is, however, a view strongly opposed to the prevailing judgement. The opinion is deeply rooted in modern as in ancient thought, that only a distinctively human element of the highest import can account for the severance between man and the highest animal below him. Differences in the mechanical organs, such as the perfection of the human hand as an instrument, or the adaptability of the human voice to the expression of human thought, are indeed of great value. But they have not of themselves such value, that to endow an ape with the hand and vocal organs of a man would be likely to raise it through any large part of the interval that now separates it from humanity. Much more is to be said for the view that man's larger and more highly organized brain accounts for those mental powers in which he so absolutely surpasses the brutes.

The distinction does not seem to lie principally in the range and delicacy of direct sensation, as may be judged from such well-known facts as man's inferiority to the eagle in sight, or to the dog in scent. At the same time, it seems that the human sensory organs may have in various respects acuteness beyond those of other creatures. But, beyond a doubt, man possesses, and in some way possesses by virtue of his superior brain, a power of co-ordinating the impressions of his senses, which enables him to understand the world he lives in, and by understanding to use, resist, and even in a measure rule it. No human art shows the nature of this human attribute more clearly than does language. Man shares with the mammalia and birds the direct expression of the feelings by emotional tones and interjectional cries; the parrot's power of articulated utterance almost equals his own; and, by association of ideas in some measure, some of the lower animals have even learnt to recognize words he utters. But, to use words in themselves unmeaning, as symbols by which to conduct and convey the complex intellectual processes in which mental conceptions are suggested, compared, combined, and even analyzed, and new ones created - this is

a faculty which is scarcely to be traced in any lower animal. The view that this, with other mental processes, is a function of the brain, irremarkably corroborated by modern investigation of the disease of aphasia, where the power of thinking remains, but the power is lost of recalling the word corresponding to the thought, and this mental defect is found to accompany a diseased state of a particular locality of the brain.* This may stand among the most perfect of the many evidences that, in Professor Bain's words, "the brain is the principle, though not the sole organ of mind." As the brains of vertebrate animals form an ascending scale, more and more approaching man's in their arrangement, the fact here finds its explanation, that lower animals perform mental processes corresponding in their nature to our own, though of generally less power and complexity. The full evidence of this correspondence will be found in such works as Brehm's *Thierleben*; and some of the salient points are set forth by Mr. Darwin, in the chapter on "Mental Powers," in his *Descent of Man*. Such are the similar effects of terror on man and the lower animals, causing the muscles to tremble, the heart to palpitate, the sphincters to be relaxed, and the hair to stand on end. The phenomena of memory, both as to persons and places, is strong in animals, as is manifest by their recognition of their masters, and their returning at once to habits disused for many years, but of which their brain had not lost the stored-up impressions. Such facts as that dogs "hunt in dreams," make it likely that their minds are not only sensible to actual events, present and past, but [6] can, like our minds, combine revived sensations into ideal scenes in which they are actors, - that is to say, they have the faculty of imagination. As for the reasoning powers in animals, the accounts of monkeys learning by experience to break eggs carefully, and pick off bits of shell, so as not to lose the contents, or of the way in which rats or martens after awhile can no longer be caught by the same kind of trap, with innumerable similar facts show in the plainest way that the reason of animals goes so far as to form by new experience a new hypothesis of cause and effect which will henceforth guide their actions. The employment of mechanical instruments, of which instances of monkeys using sticks and stones, and some other

* See "Diseases of Memory," by Th. Ribot, No. 46 Humboldt Library

similar cases, furnish the only rudimentary traces among the lower animals, is one of the often quoted distinctive powers of man. With this comes the whole vast and ever-widening range of inventive and adaptive art, where the uniform hereditary instinct of the cell-forming bee and the nest-building bird are supplanted by multiform processes and constructions, often at first rude and clumsy in comparison to those of the lower instinct, but carried on by the faculty of improvement and new invention into ever higher stages. "From the moment," writes Mr. Wallace (*Natural Selection*, p.325), "when the first skin was used as a covering, when the first rude spear was formed to assist in the chase, when fire was first used to cook his food, when the first seed was sown or shoot planted, a grand revolution was effected in nature, a revolution which in all the previous ages of the earth's history had had no parallel; for a being had arisen who was no longer necessarily subject to change with the changing universe, - a being who was in some degree superior to nature, inasmuch as he knew how to control and regulate her action, and could keep himself in harmony with her, not by a change in body, but by an advance of mind."

As to the lower instincts tending directly to self-preservation, it is acknowledged on all hands that man has them in a less developed state than other animals; in fact, the natural defencelessness of the human being, and the long-continued care and teaching of the young by the elders, are among the commonest themes of moral discourse. Parental tenderness and care for the young are strongly marked among the lower animals, though so inferior in scope and duration to the human qualities; and the same may be said of the mutual forbearance and defense which bind together in a rudimentary social bond the families and herds of animals. Philosophy seeking knowledge for its own sake; morality manifested in the sense of truth, right, and virtue; and religion, the belief in and communion with superhuman powers ruling and pervading the universe, are human characters, of which it is instructive to trace, if possible, the earliest symptoms in the lower animals, but which can there show at most only faint and rudimentary signs of their wondrous development in mankind. That the tracing of physical and even intellectual continuity between the lower animals and our own race, does not necessarily lead the anthropologist to lower the rank of man in the scale of nature, cannot be better shown than by citing one of the authors of the development

theory, Mr. A.R. Wallace (*op. cit.*, p.324). Man, he considers, is to be placed "apart, as not only the head and culminating point of the grand series of organic nature, but as in some degree a new and distinct order of being."

To regard the intellectual functions of the brain and nervous system as alone to be considered in the psychological comparison of man with the lower animals, is a view satisfactory to those thinkers who hold materialistic views. According to this school, man is a machine, no doubt the most complex and wonderfully adapted of all known machines, but still neither more nor less than an instrument whose energy is provided by force [7] from without, and which, when set in action, performs the various operations for which its structure fits it, namely, to live, move, feel, and think. This doctrine, which may be followed up from Descartes's theory of animal life into the systems of modern writers of the school of Moleschott and Büchner, underlies the *Lectures on Man* of Professor Carl Vogt, one of the ablest of modern anthropologists (English translation published by Anthropological Society, London, 1864). Such views, however, always have been and are strongly opposed by those who accept on theological grounds a spiritualistic doctrine, or what is, perhaps, more usual, a theory which combines spiritualism and materialism in the doctrine of a composite nature in man, animals as to the body and in some measure as to the mind, spiritual as to the soul. It may be useful, as an illustration of one opinion on this subject, to continue here from an earlier page the citation of Dr. Prichard's comparison between man and the lower animals:-

" If it be inquired in what the still more remarkable difference consists, it is by no means easy to reply. By some it will be said that man while similar in the organization of his body to the lower tribes, is distinguished from them by the possession of an immaterial soul, a principle capable of conscious feeling, of intellect and thought. To many persons it will appear paradoxical to ascribe the endowment of a soul to the inferior tribes in the creation, yet it is difficult to discover a valid argument that limits the possession of an immaterial principle to man. The phenomena of feeling, of desire and aversion, of love and hatred, of fear and revenge, and the perception of external relations manifested in the life of brutes, imply, not only through the analogy which they display to the human faculties, but likewise from all that we can learn or conjecture of their particular nature, the superadded existence of a principle distinct from the mere mechanism of material bodies. that such

a principle must exist in all beings capable of sensation, or of anything analogous to human passions and feelings, will hardly be denied by those who perceive the force of arguments which metaphysically demonstrate the immaterial nature of the mind. There may be no rational grounds for the ancient dogma that the souls of the lower animals were imperishable, like the soul of man; this is, however, a problem which we are not called upon to discuss; and we may venture to conjecture that there may be immaterial essences of divers kinds, and endowed with various attributes and capabilities. But the real nature of these unseen principles eludes our research: they are only known to us by their external manifestations. These manifestations are the various powers and capabilities, or rather the habitudes of action, which characterize the different orders of being, diversified according to their several destinations."

Dr. Prichard here puts forward distinctly the time-honored doctrine which refers the mental faculties to the operation of the soul. The view maintained by a distinguished comparative anatomist, Professor Mivart, in his *Genesis of Species*, ch. xii, may fairly follow. "Man, according to the old scholastic definition, is 'a rational animal' (*animal rationale*), and his animality is distinct in nature from his rationality, though inseparably joined, during life, in one common personality. Man's animal body must have had a different source from that of the spiritual soul which informs it, owing to the distinctness of the two orders to which those two existences severally belong." Not to pursue into its details a doctrine which has its place rather in a theological than an anthropological article, it remains to be remarked that the two extracts just given, however significant in themselves, fail to render an account of the view of the human constitution which would probably, among the theological and scholastic leaders of public opinion, count the largest weight of adherence. According to this view, not only life but thought are functions of the animal system, in which man excels all other animals as to height of organization; but beyond this, man embodies an immaterial and immortal spiritual principle which no lower creature possesses, and which makes the resemblance of the apes to him but a mocking simulance. To pronounce any absolute decision on these conflicting doctrines is foreign to our present purpose, which is to show that all of them count among their adherents men of high rank in science.

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III. ORIGIN OF MAN.

Available information on this great problem has been multiplied tenfold during the present generation, and the positive dicta of the older authorities are now more and more supplanted by hypotheses based on biological evidence. Opinion as to the genesis of man is divided between the theories of the two great schools of biology, that of creation and that of evolution. In both schools the ancient doctrine of the contemporaneous appearance on earth of all species of animals having been abandoned under the positive evidence of geology, it is admitted that the animal kingdom, past and present, includes a vast series of successive forms, whose appearances and disappearances have taken place at intervals during an immense lapse of ages. The line of inquiry has thus been directed to ascertaining what formative relation subsists among these species and genera, the last link of the argument reaching to the relation between man and the lower creatures preceding him in time. On both the theories here concerned it would be admitted, in the words of Agassiz (*Principles of Zoology*, pp. 205-6), that "there is a manifest progress in the succession of beings on the surface of the earth. This progress consists in an increasing similarity of the living fauna, and, among the vertebrates especially, in their increasing resemblance to man." Agassiz continues, however, in terms characteristic of the creationist school: "But this connection is not the consequence of a direct lineage between the fauna of different ages. There is nothing like parental descent connecting them. The fishes of the Palæozoic age are in no respect the ancestors of the reptiles of the Secondary age, nor does man descend from the mammals which preceded him in the Tertiary age. The link by which they are connected is of a higher and immaterial nature; and their connection is to be sought in the view of the Creator himself, whose aim in forming the earth, in allowing it to undergo the successive changes which geology has pointed out, and in creating successively all the different types of animals which have passed away, was to introduce man upon the surface of our globe. Man is the end toward which all the animal creation has tended from the first appearance of the first Palæozoic fishes." The evolutionist school, on the contrary, maintains that different successive species of animals are in fact connected by parental descent, having become modified in the course of successive generations. Mr. Darwin, with whose name and that of Mr.

Wallace the modern development theory is especially associated, in the preface to his *Descent of Man* (1871), gives precedence among naturalists to Lamarck, as having long ago come to the conclusion "that man is the co-descendant with other species of some ancient, lower, and extinct form." Professor Huxley, remarking (*Man's Place in Nature*) on the crudeness and even absurdity of some of Lamarck's views, dates from Darwin the scientific existence of the development theory. The result of Darwin's application of this theory to man may be given in his own words (*Descent of Man*, part i. ch. 6): -

"The catarhine and Platyrrhine monkeys agree in a multitude of characters, as is shown by their unquestionably belonging to one and the same Order. The many characters which they possess in common can hardly have been independently acquired by so many distinct species; so that these characters must have been inherited. But an ancient form which possessed many characters common to the Catarhine and Platyrrhine monkeys, and others in an intermediate condition, and some few perhaps distinct from those now present in either group, would undoubtedly have been ranked, if seen by a naturalist, as an ape or monkey. And as man under a genealogical point of view belongs to the Catarhine or Old World stock, we must conclude, however much the conclusion may revolt our pride, that our early progenitors would have been properly thus designated. But we must not fall into the error of supposing that the early progenitor of the whole Simian stock, including man, was identical with, or even closely resembled, any existing ape or monkey."

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The problem of the origin of man cannot be properly discussed apart from the full problem of the origin of species. The homologies between man and other animals which both schools try to account for; the explanation of the intervals, with apparent want of immediate forms, which seem to the creationist so absolute a separation between species; the evidence of useless "rudimentary organs," such as in man the external shell of the ear, and the muscle which enables some individuals to twitch their ears, which rudimentary parts the evolutionists claim to be only explicable as relics of an earlier specific condition, - these, which are the main points of the argument on the origin of man, belong to general biology. The philosophical principles which underlie the two theories stand for the most part in strong contrast, the theory of evolution tending toward the supposition of ordinary causes, such as "natural selection," producing modifications in species, whether by

gradual accumulation or more sudden leaps, while the theory of creation is prone to have recourse to acts of supernatural intervention (see the Duke of Argyll, *Reign of Law*, ch. 5). A theory has been propounded by Mr. Mivart (*Genesis of Species*, 1871) of a natural evolution of man as to his body, combined with a supernatural creation as to his soul; but this attempt to meet the difficulties on both sides seems at present not to have satisfied either. Anthropology waits to see whether the discovery of intermediate forms, which has of late years reduced so many asserted species to mere varieties, will go on till it produces a disbelief in any real separation between neighbouring species, and especially whether geology can furnish traces of the hypothetical animal, man's near ancestor, but not as yet man. In the present state of the argument it may here suffice to have briefly indicated the positions held on either side. (Among other works relating to the development theory as applied to man, see Vogt, *Lectures on Man*, Haeckel, *Natürliche Schöpfungsgeschichte*, 2nd ed., 1871.)

IV RACES OF MANKIND.

The classification of mankind into permanent varieties or races, rests on grounds which are within limits not only obvious but definite. Whether from a popular or scientific point of view, it would be admitted that a Negro, a Chinese, and an Australian, belong to three such permanent varieties of men, all plainly distinguishable from one another and from any European. Moreover, such a division takes for granted the idea which is involved in the word race, that each of these varieties is due to special ancestry, each race thus representing an ancient breed or stock, however these breeds or stocks may have had their origin. The anthropological classification of mankind is thus zoological in its nature, like that of the varieties or species of any other animal group, and the characters on which it is based are in great measure physical, though intellectual and traditional peculiarities, such as moral habit and language, furnish important aid. Among the best-marked race-characters are the following:-

The color of the skin has always been held as specially distinctive. The colored race-portraits of ancient Egypt remain to prove the permanence of complexion during a lapse of a hundred generations, distinguishing coarsely but clearly the types of the red-brown Egyptian, the

yellow-brown Canaanite, the comparatively fair Libyan, and the Negro (see Wilkinson, *Ancient Eg.*; vol. ii). These broad distinctions have the same kind of value as the popular terms describing white, yellow, brown, and black races, which often occur in ancient writings, and are still used. But for scientific purposes [10] greater accuracy is required, and this is now satisfactorily attained by the use of Dr. Broca's graduated series of colors as a standard (*Memoires de la Société d'Anthropologie de Paris*, ii). By this table the varieties of the human skin may be followed from the fairest hue of the Swede and the darker tint of the Provençal, to the withered-leaf brown of the Hottentot, the chocolate brown of the Mexican, and the brown-black of the West-African. The color of the eyes and hair is also to be defined accurately by Broca's table. This affords, however, less means of distinction, from the extent in which dark tints of hair and iris are common to races whose skins are more perceptibly different; yet some varieties are characteristic, such as the blue eyes and flaxen hair of the fair race of Northern Europe.

As to the hair, its structure and arrangement is a better indication of race than its tint. The hair differs in quantity between scantiness on the body of the Mongul and profusion on the body of the Aino; while as to the arrangement on the scalp, the tufts of the Bushman contrast with the more equal distribution on the European head. The straight hair of the North American or Malay is recognizable at once as different from the waving or curling hair of the European and both from the naturally frizzed hair of the Negro. These marked differences are due to the structure of the hair, which, examined in sections under the microscope, varies from the circular section proper to the straight-haired races, to the more or less symmetrically oval or reniform sections belonging to races with curled and twisted hair (see Pruner-Bey in *Mém. de la Soc. Anthropol.*, vol.ii).

Stature is by no means a general criterion of race, and it would not, for instance, be difficult to choose groups of Englishmen, Kafirs, and North American Indians, whose mean height should hardly differ. Yet in many cases it is a valuable means of distinction, as between the tall Patagonians and the stunted Fuegians, and even as a help in minuter problems, such as separating the Teutonic and Keltic ancestry in the population of England (see Bedoe, "Stature and

Bulk of Man in the British Isles," in *Mem. Anthropol. Soc. Lon.*, vol. iii.). Proportions of the limbs, compared in length with the trunk, have been claimed as constituting peculiarities of African and American races; and other anatomical points, such as the conformation of the pelvis, have speciality. But inferences of this class have hardly attained to sufficient certainty and generality to be set down in the form of rules.

The conformation of the skull is second only to the colour of the skin as a criterion for the distinction of race. The principle modes of estimating the differences of skulls are the following: - The skull being seen from above, the proportions of the two diameters are estimated on the principle employed by Retzius: taking the longer diameter from front to back as 100, if the shorter or cross diameter falls below 80, the skull may be classed as long (dolichocephalic); while if it exceeds 80, the skull may be classed as broad (bracycephalic); or a third division may be introduced between these as intermediate (Mesocephalic), comprehending skulls with a proportionate breadth of 75 to 80, or thereabout. The percentage of breadth to length measured in this manner is known as the cephalic index; thus, the cephalic index of a Negro or Australian may be as low as 72, and that of a Tatar as high as 88, while the majority of Europeans have an index not departing in either direction very far from 78. The cephalic height is measured in the same way as a percentage of the length. The back view (*norma occipitalis*) of the skull is distinguished as rounded, pentagonal, etc., and the base view of the skull shows the position of the occipital foramen and the zygomatic arches. The position of the jaws is recognized as important, races being described as prognathous when the jaw projects far, as in the Australian [11] or Negro, in contradistinction to the orthognathous type, which is that of the ordinary well-shaped European skull. On this distinction in the great measure depends the celebrated "facial angle," measured by Camper as a test of low and high races; but this angle is objectionable as resulting partly from the development of the forehead and partly from the position of the jaws. The capacity of the cranium is estimated in cubic measure by filling it with sand, etc., with the general result that the civilized white man is found to have a larger brain than the barbarian or savage.

Classification of races on cranial measurements has long been attempted by eminent anatomists, such as Blumenbach and

Retzius, while the later labors of Von Baer, Welcker, Davis, Broca, Busk, Lucae, and many others, have brought the distinctions to extreme minuteness. In certain cases great reliance may be placed on such measurements. Thus the skulls of an Australian and a Negro would be generally distinguished by their narrowness and the projection of the jaw from that of any Englishman; while, although both the Australian and Negro are thus dolicephalic and prognathous, the first would usually differ perceptibly from the second in its upright sides and strong orbital ridges. The relation of height to breadth may furnish a valuable test; thus both the Kafir and the Bushman are dolicephalic, with an index of about 72, but they differ in the index of height, which may be 73 and 71 respectively, in the one case more than the width and in the other less. It is, however, acknowledged by all experienced craniologists, that the shape of the skull may vary so much within the same tribe, and even the same family, that it must be used with extreme caution, and if possible only in conjunction with other criteria of race.

The general contour of the face, in part dependent on the form of the skull, varies much in different races, among whom it is loosely defined as oval, lozenge-shaped, pentagonal, etc. Of particular features, some of the most marked contrasts to European types are seen in the oblique Chinese eyes, the broad-set Kamchadal cheeks, the pointed Arab chin, the snub Kirghis nose, the fleshy protuberant Negro lips, and the broad Kalmak ear. Taken altogether, the features have a typical character which popular observation seizes with some degree of correctness, as in the recognition of the Jewish countenance in a European city.

The state of adaptation in which each people stands to its native climate forms a definite race-character. In its extreme form this is instanced in the harmful effect of the climate of India on children of European parents, and the corresponding danger in transporting natives of tropical climates to England. Typical instances of the relation of race-constitutions to particular diseases are seen in the liability of Europeans in the West Indies to yellow fever from which Negroes are exempt, and in the habitation by tribes in India of do-called "unhealthy districts," whose climate is deadly to Europeans, and even to natives of neighbouring regions. Even the vermin infesting different races of men are classified by Mr. A. Murray (*Trans. R. Soc. Edin.*, vol. xxii.) as distinct.

The physical capabilities of different races are known to differ widely, but it is not easy to discriminate here between hereditary race-differences and those due to particular food and habit of life. A similar difficulty has hitherto stood in the way of any definite classification of the emotional, moral, and intellectual characters of races. Some of the most confident judgments which have been delivered on this subject have been dictated by prejudice or wilful slander, as in the many lamentable cases in which slaveholders and conquerors have excused their ill-treatment of subject and invaded races on the ground their being creatures of bestial nature in mind and morals. Two of the best-[12]marked contrasts of mental type recorded among races are Mr. A.R. Wallace's distinction between the shy, reserved, and impassive Malay and the sociable and demonstrative Papuan (*Tr. Eth. Soc.*, vol. iii. p.200), and the very similar difference pointed out between the dull and morose natives of the Brazilian forests, and the lively sensuous African Negroes brought into contact with them (*Reise in Brasilien*, vol. i.) In general, however, descriptions of national or racial character are so vitiated by the confusion of peculiarity of natural character with the stage of civilization, that they can only be made use of with the greatest reserve.

The relation of language to race is discussed below. (Section VI.)

Were the race-characters indicated in the foregoing paragraphs constant in degree or even in kind, the classification of races would be an easy task. In fact it is not so, for every division of mankind presents in every character wide deviations from a standard. Thus the Negro race, well marked as it may seem at first glance, proves on closer examination to include several shades of complexion and features, in some districts varying far from the accepted Negro type; while the examination of a series of native American tribes shows that, notwithstanding their asserted uniformity of type, they differ in stature, color, features, and proportions of skull. (See Prichard, *Nat. Hist. of Man*; Waitz, *Anthropology*, part i sec. 5.). Detailed anthropological research, indeed, more and more justifies Blumenbach's words, that "innumerable varieties of mankind run into one another by insensible degrees." This state of things, due partly to mixture and crossing of races, and partly to independent variation of types, makes the attempt to arrange the whole human species within the exactly bounded divisions an

apparently hopeless task. It does not follow, however, that the attempt to distinguish special races should be given up, for there at least exist several definable types, each of which so far prevails in a certain population as to be taken as its standard. M. Quetelet's plan of defining such types will probably meet with general acceptance as the scientific method proper to this branch of anthropology. It consists in the determination of the standard, or typical "mean man" (*homme moyen*) of a population, with reference to any particular quality, such as stature, weight, complexion, etc. In the case of stature, this would be done by measuring a sufficient number of men, and counting how many of them belong to each height on the scale. If it be thus ascertained, as it might be in an English district, that the 5 ft. 7 in. men form the most numerous group, while the 5 ft. 6 in. and 5 ft. 8 in. men are less in number, and the 5 ft. 5 in. and 5 ft. 9 in. still fewer, and so on until the extremely small number of extremely short or tall individuals of 5 ft. or 7 ft. is reached, it will thus be ascertained that the stature of the mean or typical man is to be taken as 5 ft. 7 in. The method is thus that of selecting as the standard the most numerous group, on both sides of which the groups decrease in number as they vary in type. Such classification may show the existence of two or more types in a community, as, for instance, the population of a Californian settlement made up of Whites and Chinese might show two predominant groups (one of 5 ft. 8 in., the other of 5 ft. 4 in.) corresponding to these two racial types. It need hardly be said that this method of determining the mean type of a race, as being that of its really existing and most numerous class, is altogether superior to the mere calculation of an average, which may actually be represented by comparatively few individuals, and those the exceptional ones. For instance, the average stature of the mixed European and Chinese population just referred to might be 5 ft. 6 in. - a worthless and, indeed, misleading result. (For particulars of Quetelet's method, see his *Physique Sociale*, 1869, and *Anthropométrie*, 1870) The [13] measurement and description of the various races of men are now carried to great minuteness (the tables in Scherzer and Schwarz, *Reise der Novara*, and those of Fritsch, *Die Eingeborenen Süd-Afrika's*, 1872, may be cited as examples of modern method), so that race classification is rapidly improving as to both scope and accuracy. Even where comparatively loose observations have been made, it is

possible, by inspection of considerable numbers of individuals, to determine the prevalent type of a race with tolerable approximation to the real mean or standard man. It is in this way that the subdivision of mankind into races, so far as it has been done to any purpose, has been carried out by anthropologists.

These classifications have been numerous, and though, regarded as systems, most of them are now seen at the first glance to be unsatisfactory, yet they have been of great value in systematizing knowledge, and are all more or less based on indisputable distinctions. Blumenbach's division, though published nearly a century ago (1781), has had the greatest influence. He reckons five races, viz., Caucasian, Mongolian, Ethiopian, American, Malay (see the collected edition of his *Treatises*, p. 254, published by the Anthropological Society). The ill-chosen name of Caucasian, used by Blumenbach to denote what may be called white men, is still current; it brings into one race people such as the Arabs and Swedes, although these are scarcely less different than the Americans and Malays, who are set down as two distinct races. Again, two of the best marked varieties of mankind are the Australians and the Bushmen, neither of whom, however, seem to have a natural place in Blumenbach's series. The yet simpler classification by Cuvier into Caucasian, Mongol, and Negro, corresponds in some measure with a division by mere complexion into white, yellow, and black races; but neither this threefold division, nor the ancient classification into Semitic, Hamitic, and Japhetic nations can be regarded as separating the human types either justly or sufficiently (see Prichard, *Natural History of Man*, sec. 15; Waitz, *Anthropology*, vol. i. part i. sec. 5). Schemes which set up a larger number of distinct races, such as the eleven of Pickering, the fifteen of Bory de St. Vincent, and the sixteen of Desmoulins, have the advantage of finding niches for most well-defined human varieties; but no modern naturalist would be likely to adopt any one of these as it stands. In criticism of Pickering's system, it is sufficient to point out that he divides the white nations into two races, entitled the Arab and the Abyssinian (Pickering, *Races of Man*, chap. i.) Agassiz, Nott, Crawford, and others who have assumed a much larger number of races or species of man, are not considered to have satisfactorily defined a corresponding number of distinguishable types. On the whole, Professor Huxley's recent scheme

(*Journal of the Ethnological Society*, vol. ii. p. 404, 1870) probably approaches more nearly than any other to such a tentative classification as may be accepted in definition of the principle varieties of mankind, regarded from a zoological point of view, though anthropologists may be disposed to erect into separate races several of his widely-differing sub-races. He distinguishes four principle types of mankind, the Australioid, Negroid, Mongoloid, and Xanthochroic, adding a fifth variety, the Melanochroic.

The special points of the Australioid are a chocolate-brown skin, dark brown or black eyes, black hair (usually wavy), narrow (dolichocephalic) skull, brow-ridges strongly developed, projecting jaw, course lips, and broad nose. This type is best represented by the natives of Australia, and next to them, by the indigenous tribes of Southern India, the so-called coolies. The Egyptians to some degree approach this type; they are, however, held by good authorities to be a modified African race.

[14] The Negroid type is primarily represented by the Negro of Africa, between the Sahara and the Cape district, including Madagascar. The skin varies from dark brown to brown-black, with eyes of similar dark hue, and hair usually black, and always crisp or woolly. The skull is narrow (dolichocephalic), with orbital ridges not prominent, prognathous, with depressed nasal bones; causing the nose to be flat as well as broad; and the lips are course and projecting. two important families are classed in this system as special modifications of the Negroid type. First, the Bushman of South Africa is diminutive in stature, and of yellowish-brown complexion; the Hottentot is supposed to be the result of crossing between the Bushman and ordinary Negroid. Second, the Negritos of the Andaman Islands, the peninsula of Malacca, the Philippines and other islands, to New Caledonia and Tasmania, are mostly dolichocephalic, with dark skins and woolly hair. In various districts they tend toward other types, and show traces of mixture.

The Mongoloid type prevails over the vast area lying east of the line drawn from Lapland to Siam. Its definition includes a short, squat build, a yellowish brown complexion, with black eyes and black straight hair, a broad (brachycephalic) skull, usually without prominent brow-ridges, flat small nose, and oblique eyes. the dolicephalic Chinese and Japanese in other respects correspond. various other important branches of the human species

are brought into connection with the Mongoloid type, though on this view the differences they present raise difficult problems of gradual variation, as well as of mixture of race; these are the Dyak-Malys, the Polynesians, and the Americans.

The Xanthochroi, or fair whites - tall, with almost colorless skin, blue or gray eyes, hair from straw color to chestnut, and skulls varying as to proportionate width - are the prevalent inhabitants of Northern Europe, and the type may be traced into North Africa, and eastward as far as Hindostan. On the south and west it mixes with that of the Melanochroi, or dark whites, and on the north and east with that of the Mongoloids.

The Melanochroi, or dark whites, differ from the fair whites in the darkening of the complexion to brownish and olive, and of the eyes and hair to black, while the stature is somewhat lower and the frame lighter. To this class belong a large part of those classed as Kelts, and of the populations of Southern Europe, such as Spaniards, Greeks, and Arabs, extending as far as India; while endless intermediate grades between the two white types testify to ages of intermingling. Professor Huxley is disposed to account for the Melanochroi as themselves the result of crossing between the Xanthochroi and the Australoids. Whatever ground there may be for his view, it is obviously desirable to place them in a class by themselves, distinguishing them by an appropriate name.

In determining whether the races of mankind are to be classed as varieties of one species, it is important to decide whether every two races can unite to produce fertile offspring. It is settled by experience that the most numerous and well-known crossed races, such as the Mulattos, descended from Europeans and Negroes - the Mestizos, from Europeans and American indigenes - the Zambos, from these American indigenes, and Negroes, etc., are permanently fertile. They practically constitute sub-races, with a general blending of the characters of the two parents, and only differing from fully established races in more or less tendency to revert to one or other of the original types. It has been argued, on the other hand, that not all such mixed breeds are permanent, and especially that the cross between Europeans and Australian indigenes is almost sterile; but this assertion, when examined with the care demanded by its bearing on the general question of hybridity, has distinctly broken down. On the

[15] whole, the general evidence favors the opinion that any two races may combine to produce a new sub-race, which again may combine with any other variety. (See Waitz, *Anthropology*, vol. i., part i., sec. 3; Darwin, *Descent of Man*, part i. ch. 7; Prichard, *Nat. Hist. of Man*, sect. 5; on the other hand, Broca, *Phenomena of Hybridity in the Genus Homo*, 1864.) Thus if the existence of a small number of distinct races of mankind be taken as a starting-point, it is obvious that their crossing would produce an indefinite number of secondary varieties, such as the population of the world actually presents. The working out in detail of the problem, how far the differences among the complex nations, such as those of Europe, may have been brought about by hybridity, is still, however, a task of almost hopeless intricacy. Among the boldest attempts to account for distinctly-marked populations as resulting from the intermixture of two races, are Professor Huxley's view that the Hottentots are hybrid between the Bushmen and the Negroes, and his more important suggestion, that the Melanochroic peoples of Southern Europe are of mixed Xanthochroic and Australioid stock.

The problem of ascertaining how the small number of races, distinct enough to be called primary, can have assumed their different types, has been for years the most disputed field of anthropology, the battle-ground of the rival schools of monogenists and polygenists. The one has claimed all mankind to be descended from one original stock, and generally from a single pair; the other has contended for the several primary races being separate species of independent origin. It is not merely as a question of natural history that the matter has been argued. Biblical authority has been appealed to, mostly on the side of the monogenists, as recording the descent of mankind from a single pair. (See, for example, Horne's *Introduction to the Scriptures*; the Speaker's Commentary, Gen. i.) On the other hand, however, the polygenists not less confidently claim passages from which they infer the existence of non-Adamite, as well as Adamite races of man. (See, for example, R.S. Poole, *Genesis of the Earth and Man*.) Nor have political considerations been without influence, as where, for instance, one American school of ethnologists have been thought to have formed, under the bias of a social system recognizing slavery, their opinion that the Negro and the white man are of different species. (See Morton, *Crania Americana*; Nott and Gliddon, *Types of*

Mankind.) Of the older school of scientific monogenists, Blumenbach and Prichard are eminent representatives, as is Quatrefages of the more modern. The great problem of the monogenist theory is to explain by what course of variation the so different races of man have arisen from a single stock. In ancient times little difficulty was felt in this, authorities such as Aristotle and Vitruvius seeing in climate and circumstance the natural cause of racial differences, the Ethiopian having been blackened by the tropic sun, etc. Later and closer observations, however, have shown such influences to be, at any rate, far slighter in amount and slower in operation than was once supposed. M. de Quatrefages brings forward (*Unité de l'Espèce Humaine*, Paris, 1861, ch. 13) his strongest arguments for the variability of races under change of climate, etc., (*action du milieu*,) instancing the asserted alteration in complexion, constitution, and character of Negroes in America, and Englishmen in America and Australia. But although the reality of some such modification is not disputed, especially as to stature and constitution, its amount is not enough to upset the counter-proposition of the remarkable permanence of type displayed by races ages after they have been transported to climates extremely different from that of their former home. Moreover, physically different races, such as the Bushmen and Negroids in Africa, show no signs of approximation under the influence of the [16] same climate; while, on the other hand, the coast tribes of Tierra del Fuego and forest tribes of tropical Brazil continue to resemble one another, in spite of extreme differences of climate and food. Mr. Darwin, than whom no naturalist could be more competent to appraise the variation of a species, is moderate in his estimation of the changes produced on races of man by climate and mode of life within the range of history (*Descent of Man*, part i. ch. 4 and 7). The slowness and slowness of variation in human races having become known, a great difficulty of the monogenist theory was seen to lie in the shortness of the chronology with which it was formerly associated. Inasmuch as several well-marked races of mankind, such as the Egyptian, Phoenician, Ethiopian, etc., were much the same three or four thousand years ago as now, their variation from a single stock in the course of any period could hardly be accounted for without a miracle. This difficulty was escaped by the polygenist theory, which, till a few years since,

was gaining ground. (See Pouchet, *Plurality of the Human race*, 2nd ed., 1864, Introd.) Two modern views have, however, intervened which have tended to restore, though under a new aspect, the doctrine of a single human stock. One has been the recognition of man having existed during a vast period of time (see sec. IV., *Antiquity of Man*), which made it more easy to assume the continuance of very slow natural variation as having differenced even the white man and the Negro among the descendants of a common progenitor. The other view is that of the evolution or development of species, at the present day so strongly upheld among naturalists. It does not follow necessarily from a theory of evolution of species that mankind must have descended from a single stock, for the hypothesis of development admits of the argument, that several simious species may have culminated in several races of man (Vogt, *Lectures on Man*, London, 1864, p. 463). The general tendency of the development theory, however, is against constituting separate species where the differences are moderate enough to be accounted for as due to variation from a single type. Mr. Darwin's summing up of the evidence as to the unity of type throughout the races of mankind is as distinctly a monogenist argument as those of Blumenbach, Prichard, or Quatrefages -

"Although the existing races of man differ in many respects, as in color, hair, shape of skull, proportions of the body, etc., yet, if their whole organization be taken in consideration they are found to resemble each other closely in a multitude of points. Many of these points are of so unimportant, or of so singular a nature, that it is extremely improbable that they should have been independently acquired by aboriginally distinct species or races. The same remark holds good with equal or greater force with respect to the numerous points of mental similarity between the most distinct races of man... Now, when naturalists observe a close agreement in numerous small details of habits, tastes, and dispositions between two or more domestic races, or between nearly allied natural forms, they use this fact as an argument that all are descended from a common progenitor, who was thus endowed; and, consequently, that all should be classed under the same species. The same argument may be applied with much force to the races of man." - (Darwin, *Descent of Man*, part i. ch. 7.)

A suggestion by Mr. A. R. Wallace has great importance in the application of the development theory to the origin of the various races of man; it is aimed to meet the main difficulty of the monogenist school, how races

which have remained fixed in type during the long period of history, such as the white man and the Negro, should have, in even a far longer period, passed by variation from a common original. Mr. Wallace's view is substantially that the remotely ancient representatives of the human species, being as yet animals too low in mind to have developed those arts of maintenance and social ordinances by which man holds his own against influences from climate and circumstance, were in their then wild state much more plastic than [17] now to external nature; so that "natural selection" and other causes met with but feeble resistance in forming the permanent varieties or races of man, whose complexion and structure still remain fixed in their descendants. (See Wallace, *Contributions to the Theory of Natural Selection*, p. 319) On the whole, it may be asserted that the doctrine of the unity of mankind now stands on a firmer basis than in previous ages. It would be premature to judge how far the problem of the origin of races may be capable of exact solution; but the experience of the last few years countenances Mr. Darwin's prophecy, that before long the dispute between the monogenists and the polygenists will die a silent and unobserved death.

V. ANTIQUITY OF MAN.

It was until of late years commonly held among the educated classes, that man's first appearance on earth might be treated on a historical basis as matter of record. It is true that the schemes drawn up by chronologists differed widely, as was naturally the case, considering the variety and inconsistency of their documentary data. On the whole, the scheme of Archbishop Usher, who computed that the earth and man were created in 4004 B.C., was the most popular. It is no longer necessary, however, to discuss these chronologies, inasmuch as new evidence has so changed the aspect of the subject, that the quasi-historical schemes of the last century would now hardly be maintained by any competent authority of any school. Geology, notwithstanding the imperfection of its results, has made it manifest that our earth must have been the seat of vegetable and animal life for an immense period of time; while the first appearance of man, though comparatively recent, is positively so remote, that an estimate between twenty and a hundred thousand years may fairly be taken as a minimum. This geological claim for a vast antiquity of the human race is supported by

the similar claim of prehistoric archæology and the science of culture, the evidence of all three departments of inquiry being intimately connected, and in perfect harmony.

During the last half century, the fact has been established that human bones and objects of human manufacture occur in such geological relation to the remains of fossil species of elephant, rhinoceros, hyæna, bear, etc., as to lead to the distinct inference that man already existed during the ancient period of these now extinct mammalia. The not quite conclusive researches of M.M. Tournal and Christol in limestone caverns of the south of France date back to 1828. About the same time Dr. Schmerling of Liège was exploring the ossiferous caverns of the valley of the Meuse, and satisfied himself that the men whose bones he found beneath the stalagmite floors, together with bones cut and flints shaped by human workmanship, had inhabited this Belgian district at the same time with the cave-bear and several other extinct animals whose bones were imbedded with them (*Recherches sur les Ossements fossiles découverts dans les Cavernes de la Province de Liège*, Liège, 1833-34). This evidence, however, met with little acceptance among scientific men. Nor, at first, was more credit given to the discovery by M. Boucher de Perthes, about 1841, of rude flint hatchets in a sand-bed containing remains of mammoth and rhinoceros at Menchecourt near Abbeville, which first find was followed by others in the same district (see Boucher de Perthes, *De l'Industrie Primitive, ou les Arts à leur Origine*, 1846; *Antiquités Celtiques et Antédiluviennes*, Paris, 1847, etc.); between 1850 and 1860 competent French and English geologists, among them Rigollot, Falconer, Prestwich, and Evans, were induced to examine into the facts, and found the evidence irresistible that man existed and used rude imple-[18]ments of chipped flint during the Quaternary or Drift period. Further investigations were now made, and overlooked results of older ones reviewed. In describing Kent's Hole, near Torquay, Mr. Godwin-Austen had maintained, as early as 1840 (*Proc. Geo. Soc. London*, vol. iii. p. 286), that the human bones and worked flints had been deposited indiscriminately together with the remains of fossil elephant, rhinoceros, etc.; a minute exploration of this cavern has since been carried on under the superintendence of Messrs. Vivian, Pengelly, and others, fully justified Mr. Godwin-Austen's earlier remark, that "there is no *a priori* reason why man and the several animals

whose remains occur in caves and in gravel should not have lived here at some remote time" (see Pengelly, "Literature of Kent's cavern," in *Trans. Devonshire Association*, 1868). Especially certain caves and rock-shelters in the province of Dordogne, in central France, were examined by a French and an English archæologist, Mons. Edouard Lartet and Mr. Henry Christy, the remains discovered showing the former prevalence of the rein-deer in this region, at that time inhabited by savages, whose bone and stone implements indicate a habit of life similar to that of the Esquimaux. Moreover, the co-existence of man with a fauna now extinct or confined to other districts was brought to yet clearer demonstration, by the discovery in these caves of certain drawings and carvings of the animals done by the ancient inhabitants themselves, such as a group of rein-deer on a piece of rein-deer horn, and a sketch of a mammoth, showing this elephant's long hair, on a piece of a mammoth's tusk from La Madeleine (Lartet and Christy, *Reliquiæ Aquitanicæ*, ed. by T.R. Jones, London, 1865, etc.). These are among the earliest and principal of a series of discoveries of human relics belonging to what may be termed geological antiquity, with which should be mentioned Mr. Boyd Dawkin's examination of the Hyæna den of Wokey Hole, Dr. Lund's researches in the caves of Brazil, those in the south of France by the Marquis de Vibraye and M.M. Garrigou and Filhol, those in Sicily by Dr. Falconer, and Mr. Bruce Foote's discovery of rude quartzite implements in the laterite of India. Fuller details of the general subject will be found in Sir C. Lyell's *Antiquity of Man*, 4th ed., London, 1873; Sir John Lubbock's *Prehistoric Times*, 3rd ed., London, 1873; Dr. H. Falconer's *Palæontological Memoires*, London, 1868; the volumes of *Proceedings of the International Congress of Prehistoric Archæology*; and the periodical *Matériaux pour l'Histoire Primitive et Naturelle de l'Homme*, edited at first by De Mortillet, and since by Trutat and Cartailhac.

This evidence is now generally accepted by geologists as carrying back the existence of man into the period of the post-glacial drift, in what is now called the Quaternary period. That this indicates an antiquity at least of tens of thousands of years may be judged in several ways. The very position in which these rude instruments were found showed that they belonged to a time quite separate from that of history. Thus, at St. Acheul flint hatchets occur in

a gravel-bed immediately overlying the chalk, which bed is covered by some 12 feet of sand and marl, capped by a layer of soil, which is shown by graves of the Gallo-Roman period to have been hardly altered during the last 1500 years. This distinction between the drift deposits and those containing relics of historic ages is, as a general rule evident at a glance. Next, the succession of ages to which different classes of remains belong is well marked; the drift implements belong to the palæolithic or old stone age, when as yet the implements were extremely rude, and not ground or polished; above these in deposit, and therefore later in time, come the artistically shaped and polished celts of the neolithic or new stone age; above these, again, relics of the [19] bronze and early iron ages, with which historical antiquity in Europe begins. Again, the animals of the Quaternary period, whose bones are found with the rude stone implements, comprise several species of mammalia which have since become extinct, such as the mammoth, the hairy rhinoceros, and the Irish elk, while others, such as the rein-deer and musk-ox, now only inhabit remote districts. It is generally considered that such a fauna indicates, at any rate during part of the Quaternary period, a severer climate than now prevails in France and England. This difference from the present conditions seems to confirm the view, that the twenty centuries of French and English history form but a fraction of the time which has elapsed since the stone implements of prehistoric tribes were first buried under beds of gravel and sand by the rivers now represented by the Thames or the Somme. Still vaster, however, is the idea of antiquity suggested by the geographical conformation of such valleys as those in which these rivers flow. The drift-beds lie on their sides often 100 to 200 feet, and even more, above the present flood-levels. As such highest deposits seem to mark the time when the rivers flowed at heights so far above the present channels, it follows that the drift-beds, and the men whose works they enclose, must have existed during a great part of the time occupied by the rivers in excavating their valleys down to their present beds. Granting it as possible that the rivers by which this enormous operation was performed were of greater volume and proportionately still greater power in flood-time than the present streams, which seem so utterly inadequate to their valleys, and granting also, that under different conditions of climate the causing of débâcles by ground-ice may have been

a powerful agent, nevertheless, with all such allowances the reckoning of ages seems vastly out of proportion to historical chronology. It is not convenient to discuss here Mr. Prestwich's division of the drift gravels into high and low level beds, nor Mr. A. Tylor's argument against this division, nor the latter's theory of a Pluvial period succeeding the Glacial period (see *Quart. Journ. Geol. Soc.*, vol. xxiv., part 2, vol. xxv part 1). The geology of the Quaternary or Post-tertiary gravels, on which the geological argument for the high antiquity of man mainly rests, has been especially treated by Prestwich in the *Philos. Trans.*, 1860, p. 277, and 1864, p. 247; see also J. Evans, *Ancient Stone Impts.*, ch. 25; references to the writings of other geologists will be found in the already mentioned works of Lyell and Lubbock.

Besides these arguments, which suggest high antiquity rather than offer means of calculation, certain inferences (accounts of which are also given in the last-named works) have been tentatively made from the depth of mud, earth, peat, etc., which has accumulated above relics of human art imbedded in ancient times. Among these is Mr. Horner's argument from the numerous borings made in the alluvium of the Nile valley to a depth of 60 feet, where down to the lowest level fragments of burnt brick and pottery were always found, showing that people advanced enough to bake brick and pottery have inhabited the valley during the long period required for the Nile inundations to deposit 60 feet of mud, at a rate probably not averaging more than a few inches in a century. Another argument is that of Professor von Morlot, based on a railway section through a conical accumulation of gravel and alluvium, which the torrent of the Tinière has gradually built up where it enters the Lake of Geneva near Villeneuve. Here three layers of vegetable soil appear, proved by the objects imbedded in them to have been the successive surface-soils in two prehistoric periods, and in the Roman period, and which now lie 4, 10, and 19 feet underground; on this [20] it is computed that if 4 feet of soil were formed in the 1500 years since the Roman period, we must go 5000 years further back for the date of the earliest human inhabitants. Calculations of this kind, loose as they are, deserve attention.

The interval between the Quaternary or Drift period and the period of historical antiquity is to some extent bridged over by relics of various intermediate civilizations, mostly of the

lower grades, and in some cases reaching back to remote dates. The lake dwellings of Switzerland are perhaps among the more recent of these. They were villages of huts built on piles in the water at some distance from the shore, for security from attack - in fact, fortified water settlements of the same nature as those of Lake Prasias in the time of Herodotus, and as those still inhabited in New Guinea and West Africa. The remains of these Swiss villages are found with the stumps of the piles still standing, often imbedded in an accumulation of mud or growth of peat which has preserved a kind of illustrative museum of the arts and habits of the lake men. From examination of the sites, it appears that the settlements are of various dates, from the neolithic or polished stone period, when instruments of metal were still unknown, to the time when bronze was introduced, and beyond this into the later age marked by the use of iron. A few of the lake villages lasted on till the Roman domination, as is proved by the presence of Roman coins and pottery, but they were soon afterward abandoned, so that their very existence was forgotten, and their rediscovery only dates from 1853, when the workmen excavating a bed of mud on the shore of the Lake of Zurich found themselves standing among the piles of a lake settlement. In Germany, Italy, and other countries, similar remains of a long pre-Roman civilization have been found. (The special works on lake habitations are Dr. Keller's *Lake Dwellings*, translated by J.E. Lee, London, 1866; and Troyon's *Habitations Lacustres*.) Indications of man's antiquity, extending farther back into prehistoric times, are further furnished by the Danish shell-heaps or "kjökkenmödding," which term, meaning "kitchen refuse-heap," has been Anglicized in "kitchen midden" (the word "midden," a dung-heap, being still current in the north of England). Along the shores of nearly all the Danish islands extensive beds or low mounds, like raised beaches, may be seen, consisting chiefly of innumerable cast-away shells, intermingled with bones, etc. Such shell-heaps are found in all quarters of the globe by the sea-shore, and may be sometimes seen in process of formation; they are simply the accumulations of shells and refuse thrown away near the huts of rude tribes subsisting principally on shellfish. The Danish kitchen middens, however, are proved to belong to a very ancient time, by the remains of the quadrupeds, birds, and fish, which served as the food of these rude hunters and fishers; among these are the bones of the wild

bull, beaver, seal, and great auk, all now extinct or rare in this region. Moreover, a striking proof of the antiquity of these shell-heaps is, that the shells of the common oyster are found of full size, whereas it cannot live at present in the brackish waters of the Baltic except near its entrance, so that it is inferred that the shores where the oyster at that time flourished were open to the salt sea. Thus, also, the eatable cockle, mussel, and periwinkle abounding in the kitchen middens are of full ocean size, whereas those now living in the adjoining waters are dwarfed to a third of their natural size by the want of saltness. It thus appears that the connection between the ocean and the Baltic has notably changed since the time of these rude stone-age people. (See the reports by Forchhammer, Steenstrup, and Worsaae on the kjökkenmöddings, made to the Copenhagen Academy of Sciences.) various other evidence is adduced in this part of the argument, [21] such as that from the Danish peat-mosses, which show the existence of man at a time when the Scotch fir was abundant; at a later period the firs were succeeded by oaks, which have again been almost superseded by beeches, a succession of changes of time. For further references to special accounts, the reader may consult the already mentioned general works on the antiquity of prehistoric man.

Lastly, chronicles and documentary records, taken in connection with archæological relics of the historical period, carry back into distant ages the starting-point of actual history, behind which lies the evidently vast period only known by inferences from the relations of languages and the stages of development of civilization. Thus, Egypt affords some basis for estimating a minimum date for its ancient population. The hieroglyphic inscriptions, the most ancient written records of the world, preserve direct memorials of a time which can hardly be less, and may be much more, than 3000 years before the Christian era. With all the doubt which besets the attempt to extract a definite chronology from the Egyptian names of kings and lists of dynasties (see Egypt), their salient points fit with the historical records of other nations. Thus, the great Ramesside dynasty, known among Egyptologists as the 19th dynasty, corresponds with the mention of the building of the city of Raamses in Exod. i. II; Amenophis III., called by the Greeks Memnon, belongs to the previous 18th dynasty; while the three pyramid kings, whom Herodotus mentions as

Cheops, Chephren, and Mykerinos, and whose actual Egyptian names are read in the hieroglyphic lists as Chufu, Chafra, and Menkaura, are set down in the 4th dynasty. Lepsius may not be over-estimating when he dates this dynasty as far back as 3124 B.C., and carries the more dubious previous dynasties back to 3892 B.C. before reaching what are known as the mythical dynasties, which probably have their bases rather in astronomical calculations than in history (Lepsius, *Königsbuch der alten Ägypter*, Berlin, 1858; compare the computations of Brugsch, Bunsen, Hincks, Wilkinson, etc.).

The Greeks of the classic period could discuss the Egyptian chronologies with priests and scribes who perpetuated the languages and records of their earlier dynasties; and as the Septuagint translation of the Bible was made at Alexandria, it is not impossible that its giving to man a considerably greater antiquity than that of the Hebrew text may have been due to the influence of the Egyptian chronology. Even if the lowest admissible calculations be taken, this will not invalidate the main fact, that above 4000 years ago the Egyptian nation already stood at a high level of industrial and social culture. The records of several other nations show that as early or not much later than this they had attained to a national civilization. The Bible, whose earliest books are among the earliest existing chronicles, shows an Israelite nation existing in a state of patriarchal civilization previous to the already mentioned time of contact with Egypt. In ancient Chaldæa, the inscribed bricks of Uruk's temples probably belong to a date beyond 2000 years B.C. (G. Rawlinson, *Five Great Monarchies of the Ancient Eastern World*, London, 1862, etc., vol. i ch. 8).

The Chinese dynasties, like those of Egypt, began with an obviously mythical portion, and continued into actual history; the difficulty is to draw the line where genuine record begins. Those who reckon authentic history only from the dynasty of Chow, beginning about 1100 B.C., during which Confucius lived, will at any rate hardly deny the existence of the earlier dynasty of Shang, previous to which the yet earlier dynasty of Hea is recorded; so that, though much that is related of these periods may be fabulous, it seems certain that [22] there was a Chinese nation and a Chinese civilization reaching back beyond 2000 B.C. (see Sir John Davis, *The Chinese*; Pauthier, *Livres Sacrés de l'Orient*; Shu-King, etc.)

Till of late it was commonly received opinion that the early state of society was one of comparatively high culture, and those who held this opinion felt no difficulty in assigning the origin of man to a time but little beyond the range of historical records and monuments. At present, however, the view has become paramount that the civilization of the world has been gradually developed from an original stone-age culture, such as characterizes modern savage life. To hold this opinion necessitates the adding to the 4000 or 5000 years to which the ancient civilizations of Egypt, Babylon, and China date back, a probably much greater length of time, during which the knowledge, arts, and institutions of these countries attained to their remarkably high level. The evidence of comparative philology corroborates this judgement. Thus, Hebrew and Arabic are closely related languages, neither of them the original of the other, but both sprung from some parent language more ancient than either. When, therefore, the Hebrew records have carried back to the most ancient admissible date the existence of the Hebrew language, this date must have been long preceded by that of the extinct parent language of the whole Semitic family; while this again was no doubt the descendant of languages slowly shaping themselves through the ages into this peculiar type. Yet more striking is the evidence of the Aryan or Indo-European family of languages. The Hindus, Medes, Persians, Greeks, Romans, Germans, Kelts, and Slaves make their appearance at more or less remote dates as nations separate in language as in history. Nevertheless, it is now acknowledged that at some far remoter time, before these nations were divided from the parent stock, and distributed over Asia and Europe by the Aryan dispersion, a single barbaric people stood as physical and political representatives of the nascent Aryan race, speaking a now extinct Aryan language, from which, by a series of modifications not to be estimated as possible within many thousands of years, there arose languages which have been mutually unintelligible since the dawn of history, and between which it was only possible for an age of advanced philology to trace the fundamental relationship.

From the combination of these considerations, it will be seen that the farthest date to which documentary record extends, is now generally regarded by anthropologists as but the earliest distinctly visible point of the historic

period, beyond which stretches back a vast indefinite series of prehistoric ages.

VI. LANGUAGE.

In examining how the science of language bears on the general problems of anthropology, it is not necessary to discuss at length the critical questions which arise. Philology is especially appealed to by anthropologists as contributing to the following lines of argument. A primary mental similarity of all branches of the human race is evidenced by their common faculty of speech, while at the same time secondary diversities of race-character and history are marked by difference of grammatical structure and of vocabularies. the existence of groups or families of allied languages, each group being evidently descended from a single language, affords one of the principle aids in classifying nations and races. The adoption by one language of words originally belonging to another, providing as it does the fact of intercourse between two races, and even to some extent indicating the results of such intercourse, affords a valuable clue through obscure regions of the history of civilization.

Communication by gesture-signs, [23] between persons unable to converse in vocal language, is an effective system of expression common to all mankind. Thus, the signs used to ask a deaf or dumb child about his meals and lessons, or to communicate with a savage met in the desert about game or enemies, belong to codes of gesture-signs identical in principle, and to a great extent independent both of nationality and education; there is even a natural syntax, or order of succession, in such gesture-signs. To these gestures let there be added the use of the interjectional cries, such as *oh! ugh! hey!* and imitative sounds to represent the cat's *mew*, the *click* of a trigger, the *clap* or *thud* of a blow, etc. The total result of this combination of gesture and significant sound will be a general system of expression, imperfect but serviceable, and naturally intelligible to all mankind without distinction of race. Nor is such a system of communication only theoretically conceivable; it is, and always has been, in practical operation between people ignorant of one another's language, and as such is largely used in the intercourse of savage tribes. It is true that to some extent these means of utterance are common to the lower animals, the power of expressing emotion by cries and tones extending

far down in the scale of animal life, while rudimentary gesture-signs are made by various mammals and birds. Still, the lower animals make no approach to the human system of natural utterance by gesture-signs and emotional-imitative sounds, while the practical identity of this human system among races physically so unlike as the Englishman and the native of the Australian bush, indicates extreme closeness of mental similarity throughout the human species.

When, however, the Englishman and the Australian speak each in his native tongue, only such words as belong to the interjectional and imitative classes will be naturally intelligible, and as it were instinctive to both. Thus the savage, uttering the sound *waow!* as an explanation of surprise and warning, might be answered by the white man with the not less evidently significant *sh!* of silence, and the two speakers would be on common ground when the native indicated by the name *bwirri* his cudgel, flung *whirring* through the air at a flock of birds, or when the native described as a *jakkal-yakkal* the bird called by the foreigner a *cockatoo*. With these, and other very limited classes of natural words, however, resemblance in vocabulary practically ceases. The Australian and English languages each consist mainly of a series of words having no apparent connection with the ideas they signify, and differing utterly; of course, accidental coincidences and borrowed words must be excluded from such comparisons. It would be easy to enumerate other languages of the world, such as Basque, Turkish, Hebrew, Malay, Mexican, all devoid of traceable resemblance to Australian and to English, and to one another. There is, moreover, extreme difference in the grammatical structure both of words and sentences in various languages. The question then arise, how far the employment of different vocabularies, and that to a great extent on different grammatical principles, is compatible with similarity of the speaker's minds, or how far does diversity of speech indicate diversity of mental nature? The obvious answer is, that the power of using words as signs to express thoughts with which their sound does not directly connect them, in fact as arbitrary symbols, is the highest grade of the special human faculty in language, the presence of which binds together all races of mankind in substantial mental unity. The measure of this unity is, that any child of any race can be brought up to speak the language of any other race.

To ascertain the causes to which languages owe their unlikeness in material and structure, how far to essential differences of mental type among the races of mankind, and [24] how far to minor causes of variation, which may be called secondary, is a problem of extreme difficulty, toward the precise solution of which little has yet been done. One of the most remarkable of linguistic differences is the tendency of some languages to isolate their words, and of others to form elaborate inflections. The extremes may be seen on the one hand, in an ordinary Chinese sentence of isolated monosyllables, such as "*yu tsze nien chiu tsin, tung chu,*" etc., *i.e.*, "in this year autumn ended, winter begun," etc.; and on the other hand, in one of the monstrous polysyllables into which the Greenlanders will agglutinate a whole phrase, *inilertorniar-patdlasarqôrpâ*, *i.e.* "he will probably try too much to get it done soon." Among languages which form grammatical combinations or inflexions, the modes of so doing are as various as possible. Thus, in Africa, the Hottentot noun forms its plural by a suffix, as *khoi*, "man;" *khoïn*, "men;" while the Zulu employs prefixes to distinguish its numbers, as *umu-ntu*, "a man;" *aba-ntu*, "men." The Dinka may supply examples of forming the plural by internal change, *ran*, "man," *ror*, "men." Nor are the differences of syntax in different tongues less absolute. In non-inflecting languages one of the most vital points is the relative position of two nouns, of which the one stands as substantive, and the other as defining it by an attribute. This may be illustrated by English compounds, such as *work-house* and *house-work*. Here our rule is to place the attribute-noun first, while, of two neighbouring languages of Asia, the Burmese and the Siamese, the one settles this question in our way, the other in exactly the opposite. The Siamese expression for sailors, *luk rua*, means "sons of the ship," just as the Burmese expression for villagers, *rwa tha*, means "children of the village," but in the first case the construction is "sons ship," whereas in the second it is "village children." Again, for reasons not yet fully explained, some languages place the adjective before the substantive, as Chinese *pe ma*, "white horse;" while other languages reverse this construction, as Maori, *rakua roa*, "tree long" (*i.e.* tall tree). These are but examples of possible divergences in linguistic structure, and no prudent ethnologist would assert that racial peculiarities have nothing to do with such various tendencies. At the same time, there is no proof

but that they may have resulted from historical circumstances more or less independently of race. Our own Aryan family of nations and languages affords what must always be prominent evidence in this argument. It is acknowledged that Sanskrit, Russian, Greek, Latin, Welsh, English, etc., are, philologically speaking, dialects of a single Aryan speech, which no doubt at some ancient period was spoken by a single tribe or nation. Yet the languages sprung from this original Aryan tongue, by various courses of development and accretion, are mutually unintelligible. If a Greek sentence be taken at random, such as this, "Ου χρη παν-νυχιον ευ-δειν βουληφορον ανδρα," and it be translated even too verbally into English, "A counsel-bearing man ought not to sleep all night," the traces of linguistic connection between the Greek and English words (*phoros*, *bear*; *nux*, *night*) are hardly perceptible except to philologists. Even the essential character of the two languages is seen to be different, for the construction of the Greek sentence depends mainly on the inflections of the words, while in English such inflections are almost discarded, and their effect is produced by the syntax and the auxiliary particles. Moreover, as to some most important points of syntax, Aryan languages differ widely from one another; thus, to use a familiar instance, French and English take contradictory lines as to the relative position of the adjective and substantive, as also of the object-pronoun and verb, - "*c'est un cheval blanc, je le vois*," "it is a white horse, I see him." So Hindustani and English, though [25] both Aryan tongues, reverse the positions of the verb and object, as "*ghora lao*" ("horse bring"), *i.e.*, "bring the horse!" Thus on the whole, the endless variety in vocabulary and structure among the languages of the world affords important evidence as to the mental diversities of the nations speaking those languages. But the unity of the faculty of speech in man stands as the primary fact, while the character of the grammar and dictionary belonging to any one nation represents only a secondary fact, such as might be fairly set down as resulting from their particular stage and circumstances of linguistic development.

The principles of the development of a family of languages from a single tongue are laid down in special treatises on Language. It has here to be noticed that the evidence on which such linguistic groups may be treated as allied by

descent is of various degrees of fullness and strength. The most perfect available case is that of the Romance languages, comprising Italian, Spanish, French, etc.; inasmuch as not only does the classic Latin remain substantially the representative of their common original, but the very stages of their development from it are preserved in documents of successive ages. Thus, in comparing the vocabularies of Italian and French, it is, in the first place, seen that they to a large extent correspond, - this correspondence extending to words which one language is least likely to borrow from another, viz., pronouns, the lower numerals, and names of the most universal and familiar objects. It is only, however, by etymological analysis that their depth of correspondence comes fully into view, it being seen that the ultimate elements or roots are largely common to the two languages, as are also the grammatical affixes by which words are formed from these roots, while general similarity of linguistic structure pervades both tongues. Such intimate correspondence could only result from derivation from a common parent language, which in this case exists in Latin. In other groups of languages the existence of the common parent may be inferred from correspondence of this highest order. Thus there must have existed, at some period, what may be called the parent Slavonic, whence descend the Russian, Polish, Bohemian, etc.; and the parent Keltic, whence descend Welsh, Gaelic, Breton, etc., while behind the various branches of the whole Aryan family are dimly to be discerned the outlines of a primitive Aryan speech. In like manner, a comparison of the Arabic, Hebrew, Syriac, etc., shows that these must be all derived from a primitive Semitic speech, containing many of the simple root forms, which still exist in its modern descendants, and being already characterized by the principle of internal inflection. Beyond the limits of these two, the most important linguistic families, various others have been satisfactorily made out, though hardly with the same completeness of proof. In the Turanian or Tatar family are included the Turkish, Mongol, Hungarian, Finish, Ostyak, etc.; the Dravidian family takes in the Tamil, Telugu, and various other South Indian dialects; the Polynesian family comprises the languages of the higher race of the South Sea Islands; the Negro-Kafir family consists of the prefixing languages spoken by most African Tribes from the equatorial regions southward; the Guarani family in South America, the Algonquin and Athapascan families in North

America, and the Australian family, each includes a number of tribes ranging over a vast extent of territory, and so on. As to smaller divisions, it is common for languages to occur in groups of several connected dialects, though not forming part of one of the wider linguistic families; thus the Aztec and Nicaraguan are closely related dialects, as are the Quichua and Aymara, while what philologists describe as isolated languages, as the Basque appears to be, are rather isolated groups of dialects, with no [26] known analogues beyond a limited district.

If the present state of the philological classification of mankind be compared with that of half a century ago, it will be seen that much progress has been made in referring groups of languages each to a common ancestral tongue. At the same time, greater cogency of proof is now demanded in such classification. The method of comparing a short vocabulary of twenty words or so in two languages is now abandoned, for where an extensive connection really exists, this is much better proved by a systematic comparison, while a few imperfect resemblances in the two lists might be due to accident, or the adoption of words. Nothing short of similarity in the roots or elements of two languages, as well as in their grammatical structure, too strong to be explained by any independent causes, is now admitted as valid proof of common descent. This limitation, however, by no means amounts to a denial of the possibility of such descent. Thus it is often argued, on the strength of some similarities between Hebrew and Indo-European roots, that the two so distinct Semitic and Aryan families of language are themselves sprung from some yet more remotely ancient tongue. Thus also it has been attempted to connect the Malay and Tatar groups of languages. Either or both of these opinions may be true; but the general verdict of philologists is, that they are not satisfactorily made out, and therefore cannot be recognized.

Under the present standard of evidence in comparing languages and tracing allied groups to a common origin, the crude speculations as to a single primeval language of mankind, which formerly occupied so much attention, are acknowledged to be worthless. Increased knowledge and accuracy of method have as yet only left the way open to the most widely divergent suppositions. For all that known dialects prove to the contrary, on the other hand, there may have been one primitive language, from which the descendant languages have varied so widely, that neither their words nor their

formation now indicate their unity in long past ages, while, on the other hand, the primitive tongues of mankind may have been numerous, and the extreme unlikeness of such languages as Basque, Chinese, Peruvian, Hottentot, and Sanskrit, may arise from absolute independence of origin.

The language spoken by any tribe or nation is not itself absolute evidence as to its race-affinities. This is clearly shown in extreme cases. Thus the Jews in Europe have almost lost the use of Hebrew, but speak as their vernacular the language of their adopted nation, whatever it may be; even the Jewish-German dialect, though consisting so largely of Hebrew words, is philologically German, as any sentence shows: "*Ich hab noch hojem lo geachelt*," "I have not yet eaten today." The mixture of the Israelites in Europe by marriage with other nations is probably much greater than is acknowledged by them; yet, on the whole, the race has been preserved with extraordinary strictness, as its physical characteristics sufficiently show. Language thus here fails conspicuously as a test of race, and even of natural history. Not much less conclusive is the case of the predominantly Negro populations of the West Indian Islands, who, nevertheless, speak as their native tongues dialects of English or French, in which the number of intermingled native African words is very scanty: "*Dem hitti netti na ini watra bikasi dem de fisiman*," "They cast a net into the water, because they were fishermen." (Surinam Negro-Eng.) "*Bef pas ca jamain lasse poter c6nes li*" "Le boeuf n'est jamais las de porter ses cornes." (Haytian Negro-Fr.) If it be objected that the linguistic conditions of these two races are more artificial than has been usual in the history of the world, less extreme cases may be seen in countries where the ordinary results of conquest-colonization have taken place. The [27] Mestizos, who form so large a fraction of the population of modern Mexico, numbering several millions, afford a convenient test in this respect, inasmuch as their intermediate complexion separates them from both their ancestral races, the Spaniard, and the chocolate-brown indigenous Aztec or other Mexican. The mother-tongue of this mixed race is Spanish, with an infusion of Mexican words; and a large proportion cannot speak any native dialect. In most or all nations of mankind, crossing or intermarriage of races has thus taken place between the conquering invader and the conquered native, so that the language spoken by

the nation may represent the results of conquest as much or more than of ancestry. The supersession of the Keltic Cornish by English, and of the Slavonic Old-Prussian by German, are but examples of a process which has for untold ages been supplanting native dialects, whose very names have mostly disappeared. On the other hand, the language of the warlike invader or peaceful immigrant may yield, in a few generations, to the tongue of the mass of the population, as the Nothman's was replaced by French, and modern German gives way to English in the United States. Judging, then, by the extirpation and adoption of languages within the range of history, it is obvious that to classify mankind into races, Aryan, Semitic, Turanian, Polynesian, Kafir, etc., on the mere evidence of language, is an intrinsically unsound method. From the earliest times in which nations have been classified by languages, its unrestricted use has vitiated sound ethnology.

Nevertheless, under proper restrictions, speech affords information as to the affinities of races only second in value to that derived from physical characteristics. As a rule, language at least provides some proportion of ancestry. It could hardly happen that one people should come into so close a relation to another as to supplant its language, without strong intermixture of race in the next generation. This is true in the extreme case of the West Indian colored population, among whom the majority are now crossed with European blood, so that in each succeeding generation the proportion of absolutely pure Negro families becomes less. Still more fully is it true of colored races in Mexico or Brazil whose Spanish or Portuguese language represents at least a large European element of ancestry. Thus in India many millions of people, whose blood is predominantly that of the darker indigenous race, nevertheless speak dialects of the languages of the fairer Aryans; but then they are for the most part distinctly mixed races of part Aryan ancestry. With these facts before us, it is not difficult to determine the principles on which the ethnologist may use language as partial evidence of race. In the first place, it strengthens the evidence of bodily characters. Thus in South Africa the Zulu seems by color, features, shape of skull, etc., to be, if not an absolute Negro of mixed and modified Negro origins. This view of his origin is strengthened by the fact that the Zulu language belongs to the peculiar prefixing family which extends so widely among the Negro nations farther north. So the Hottentot language,

in its evident connection with that of the Bushman, adds its weight to the physical argument, that these two are descendants more or less mixed and varied from a single race, small, yellow, crisp-haired, and speaking and inflectional monosyllabic language, articulated with clicks. In the second place, language may prove race-connection where bodily characteristics, though they do not contradict, do not suffice. Thus, comparing the dark Andalusian with the fair Swede we ask the question, whether there is distinguishable common parentage between these two varieties of the white man? The anatomist might hesitate here. Nor, indeed, is the physical problem nearly solved, but at least a partial solution is involved [28] in the philologist's proof that the two peoples speak languages inherited at some remote period from a common Aryan tongue, and must therefore have had a common element in their ancestry of at least sufficient strength to carry language with it. Thus each linguistic family affords at least partial evidence of race, proving, for instance, the existence of a common ancestry of the Irishman and the Russian, of the Jew and the Maltese, of the Tahitian and the Malagasy, though in such pairs of races the actual amount of common ancestry may be less than that of the different race-elements with which it has combined.

As regards political nationality and the history of civilization, the evidence of speech is of still greater weight. In many cases of the mixture of nations the language of the dominant civilization prevails, as where Latin dialects superseded the native tongues in Western Europe, and Germanic languages encroached on Turanian in Finland, on Slavonic in Russia, and on Keltic in the Scotch Highlands. In other cases, where one nation has received elements of civilization from another, language is apt to keep record of the process by adopting foreign words and ideas together. Thus the language of the barbarian Turks has absorbed masses of Arabic, which itself had in like manner absorbed Persian, when Persia was the fountain-head of early Moslem culture. In the same manner Dravidian languages of South India have been saturated with words and phrases from Sanskrit and its related dialects, so that a page of Tamil literature is of itself proof of a non-Aryan race having received from an Aryan race a whole system of religion, philosophy and social order. The most extreme cases of such verbal indication of foreign influence are to be found in languages of low races of America and the Pacific, which have

adopted from European languages not only terms for imported arts and ideas, but names of such numerals as 6 and 7, previously expressed by more clumsy native combinations. Thus the language of any people, though less effective than was once believed as a means of determining its place in the classified order of mankind, does, to some extent, indicate its physical, and, to a still greater extent, its intellectual ancestry.

VII. DEVELOPMENT OF CIVILIZATION.

The conditions of man at the lowest and highest known levels of culture are separated by a vast interval; but this interval is so nearly filled by known intermediate stages, that the line of continuity between the lowest savagery and the highest civilization is unbroken at any critical point. The Australians and the forest Indians of Brazil may be taken as the lowest modern savages whose thought and life have been investigated with any thoroughness; while other less accurately studied tribes are in some respects inferior even to these. An examination of the details of savage life shows not only that there is an immeasurable difference between the rudest man and the highest lower animal, but also that the least cultured savages have themselves advanced far beyond the lowest intellectual and moral state at which human tribes can be conceived as capable of existing, when placed under favorable circumstances of warm climate, abundant food, and security from too severe destructive influences. In fact, the Australian or Brazilian savage has already attained to rudimentary stages in many of the characteristic functions of civilized life. His language, expressing thoughts by conventional articulate sounds, is the same in essential principle as the most cultivated philosophic dialect, only less exact and copious. His weapons, tools, and other appliances, such as the hammer, hatchet, spear, knife, awl, thread, net, canoe, etc., [29] are the evident rudimentary analogues of what still remains in use among Europeans. His structures, such as the hut, fence, stockade, earthwork, etc., may be poor and clumsy, but they are of the same nature as our own. In the simple arts of broiling and roasting meat, the use of hides and furs for covering, the plaiting of mats and baskets, the devices of hunting, trapping, and fishing, the pleasure taken in personal ornament, the touches of artistic decorations on objects of daily use, the savage differs in degree but not in kind from the

civilized man. The domestic and social affections, the kindly care of the young and the old, some acknowledgement of marital and parental obligation, the duty of mutual defense in the tribe, the authority of the elders, and general respect to traditional custom as the regulator of life and duty, are more or less well marked in every savage tribe which is not disorganized and falling to pieces. Lastly, there is usually to be discerned among such lower races a belief in unseen powers pervading the universe, this belief shaping itself into an animistic or spiritualistic theology, mostly resulting in some kind of worship. If, again, high savage or low barbaric types be selected, as among the North American Indians, Polynesians, and Kafirs of South Africa, the same elements of culture appear, but at a more advanced stage, namely, a more full and accurate language, more knowledge of the laws of nature, more serviceable implements, more perfect industrial processes, more definite and fixed social order and frame of government, more systematic and philosophic schemes of religion, and a more elaborate and ceremonial worship. At intervals new arts and ideas appear, such as agriculture and pasturage, the manufacture of pottery, the use of metal implements, and the device of record and communication by picture-writing. Along such stages of improvement and invention the bridge is fairly made between savage and barbaric culture; and this once attained to, the remainder of the series of stages of civilization lies within the range of common knowledge.

The teaching of history, during the three to four thousand years of which contemporary chronicles have been preserved, is that civilization is gradually developed in the course of ages by enlargement and increasing precision of knowledge, invention and improvement of arts, and the progression of social and political habits and institutions toward general well being. The conditions of such races as the older Jews, Greeks, and Germans, are known to us by ancient chronicles, and by poetry and myth even more valuable than chronicle in the details they unconsciously preserve of the state of society at the time whence they have been handed down. Starting from the recorded condition of such barbaric nations, and following the general course of culture into the modern world, all the great processes of mental and social development may be seen at work. Falling back or decay also takes place, but only to a limited extent destroys the results of growth in culture. It is thus matter

of actual record, that the ancestors of civilized nations were barbaric tribes, and the inference seems reasonable that the same process of development had gone on during previous ages outside the domain of direct history, so that barbaric culture itself arose out of an earlier and ruder condition of primitive culture, more or less corresponding with the state of modern savage tribes. The failure of direct record of this passage from savagery upward to barbarism was to be expected from the circumstances of the case. No people civilized enough to preserve history could have watched the age-long process of a savage tribe developing its culture; indeed, experience shows that independent progress could hardly have taken place among an uncivilized in contact with a civilized race. Nor could a barbaric nation, though it had really and [30] independently risen from savagery within some few thousand years, give any valid account of this gradual advancement, for the very reason of its having taken place while the nation was yet in, or but little removed from, the savage state, one part of the very definition of which is that it has no trustworthy means of preserving the history of events even for a single century, much less for the long period required for so vast a development. This view of the low origin and progressive development of civilization was already held in ancient times, as in the well-known speculations of the Epicurean school on the condition of the earliest men, who roved like wild animals, seeking their food from the uncultured earth, till arts and social laws arose among them (Lucret., *De Rerum Nat.*, v. 923; Horat., *Sat.*, i. 3); or where the like idea has taken in China the form of an ancient legend, recording the time when their nation was taught to use skins for clothing, to make fire, and to dwell in houses (Pauthier, *Livres Sacrés de l'Orient*, p. 26.) In opposition to such views of primeval rudeness, traditions of a pristine state of human excellence have long been cherished, such as the "golden age" (Hesiod., *Op. et Dies*, 108). Till of late wide acceptance has been given to arguments, partly based on theological and partly on anthropological grounds, as to man's incapability of rising from a savage state, and the consequent necessity of a supernatural bestowal of culture on the first men, from whose high level savages are supposed by advocates of this theory to have degenerated. The anthropological evidence adduced in support of this doctrine is, however, too weak for citation, and even obviously erroneous arguments have been relied

on (see, for example, Archbishop Whately, *Essays on the Origin of Civilization*, and remarks on its evidence in Tylor, *Early Hist. of Man*, p. 163). It has been especially the evidence of prehistoric arcæology which, within the last few years, has given to the natural development theory of civilization a predominance hardly disputed on anthropo-logical grounds. The stone implements, which form the staple proof of man's existence at the period of the river-drift, are of extreme rudeness as compared even with ordinary savage types, so that it is obvious that the most ancient known tribes were, as to the industrial arts, at a low savage level. The remains in the caverns justify this opinion especially where in central France more precision is given to the idea of prehistoric life by the discovery of bone weapons for hunting and fishing, which suggest a rude condition resembling that of the Esquimaux (see the preceding section V., *Antiquity of Man*). The finding of ancient stone implements buried in the ground in almost every habitable district of the world, including the seats of the great ancient civilizations, such as Egypt, Assyria, India, China, Greece, etc., may be adduced to show that the inhabitants of these regions had at some time belonged to the stone age. This argument goes far to prove that the ancestors of all nations, high and low, were once in that uncultured condition as to knowledge, arts, and manners generally, which within our experience accompanies the use of stone implements. No valid refutation of this reasoning has been offered, and it is corroborated by arguments to be drawn from study of the facts of civilization, of which some will be here mentioned for their bearing on the theory of development.

History shows how development of the arts takes place by efforts of skill and insight, as where Phidias rose above the clumsier sculptors of the time before him, or where the earliest gnomon - a mere staff set up in order to have its shadow measured - passed into the graduated sun-dial; or adaptations of old contrivances produce new results, as when the ancient Pan's pipes, blown by a bellows, became the organ, when the earlier [31] block-printing led up to the use of movable types, and when the magnetic needle was taken out of the mariner's compass to find a new office on the telegraph dial; or lastly, more absolutely original inventions arise, the triumphs of the scientific imagination, such as the pendulum and the steam engine. In the evolution of science the new knowledge ever starts from

the old, whether its results be to improve, to shift, or to supersede it. The history of astronomy extends far enough back to show its barbaric stages, when the earth was regarded as a flat surface, overarched by a solid dome or firmament; and when not only was the sun considered to move round the earth, but its motions, as well as the moon's, were referred to the guidance and even the impulse of personal deities. Beginning with this first stage of the science, there lies before us the whole record of the exacter observation and closer reasoning which have gradually replaced these childlike savage conceptions by the most perfect of physical theories. Thus, again, the history of medicine shows improvement on the rude surgical appliances and the meagre list of efficient drugs which the barbaric leech had at his disposal, while its theory has changed even more absolutely than its practice; for medical history begins with the ancient world holding fast to the savage doctrine that madness, epilepsy, fever, and other diseases, are caused by demons possessing the patient - a belief which is still that of half the human race, but which it has been the slow but successful task of scientific pathology to supersede in the civilized world. In like manner, the history of judicial and administrative institutions may be appealed to for illustrations of the modes in which old social formations are reshaped to meet new require-ments, new regulations are made, and new officers are constituted to perform the more complex duties of modern society, while from time to time institutions of past ages, which have lost their original purpose, and become obsolete or hurtful, are swept away.

That processes of development similar to these have already been effective to raise culture from the savage to the barbarian level, two considerations especially tend to prove. First, there are numerous points in the culture even of rude races which are not explicable otherwise than on the theory of development. Thus, though difficult or superfluous arts may easily be lost, it is hard to imagine the abandonment of contrivances of practical daily utility, where little skill is required and materials are easily accessible. Had the Australians or New Zealanders, for instance, ever possessed the potter's art, they could hardly have forgotten it. The inference that these tribes represent the stage of culture before the invention of pottery is confirmed by the absence of buried fragments of pottery in the districts they inhabit (Lubbock, in

Report of British Association, Dundee, 1867, p. 121). The same races who were found making thread by the laborious process of twisting with the hand, would hardly have disused it if they had ever possessed it, so simple a labor-saving device as the spindle, which consists merely of a small stick weighted at one end; the spindle may, accordingly, be regarded as an instrument invented somewhere between the lowest and highest savage levels (Tylor, *Early Hist. of Mankind*, p. 193). Again, many devices of civilization bear unmistakable marks of derivation from a lower source; thus the ancient Egyptian and Assyrian harps, which differ from ours in having no front pillar, appear certainly to owe this remarkable defect to having grown up through intermediate forms from the simple strung bow, the still used type of the most primitive stringed instrument (Engel, *Music of the most Ancient Nations*, pp. 17, 30). In this way the history of numeral words furnishes actual proof of that independent intellectual progress among savage tribes which some writers have rashly denied. Such words as *hand*, *hands*, *foot*, *man*, etc., are used as numerals signifying 5, 10, 15, 20, etc., among many savage and barbaric peoples; thus the Polynesian *lima*, i.e. "hand," means 5; Zulu, *tatisitupa*, i.e. "taking the thumb," means 6; Greenlandish, *arfersanek-pingasut*, i.e. "on the other foot three," means 18; Tamanac, *tevin itoto*, i.e. "one man," means 20, etc., etc. The existence of such expressions demonstrates that the people who use them had originally no spoken names for these numbers, but once counted them by gesture on their fingers and toes in low savage fashion, till they obtained higher numerals by the inventive process of describing in words these counting gestures (Tylor, in *Journal Royal Inst.*, March 15, 1867; *Primitive Culture*, chap. vii.). Second, the process of "survival in culture" has caused the preservation in each stage of society of phenomena belonging to an earlier period, but kept up by force of custom into the later, thus supplying evidence of the modern condition being derived from the ancient. Thus the mitre over an English bishop's coat-of-arms is a survival which indicates him as the successor of bishops who actually wore mitres, while armorial bearings themselves, and the whole craft of heraldry, are survivals bearing record of a state of warfare and social order whence our present state was by vast modification evolved. Evidence of this class, proving the derivation of modern civilization, not only from ancient barbarism, but beyond this,

from primeval savagery, is immensely plentiful, especially in rites and ceremonies, where the survival of ancient habits is peculiarly favored. Thus the modern Hindu, though using civilized means for lighting his household fire, retains the savage "fire-drill" for obtaining fire by friction of wood when what he considers pure or sacred fire has to be produced for sacrificial purposes; while in Europe into modern times the same primitive process has been kept up in producing the sacred and magical "need-fire," which was lighted to deliver cattle from a murrain. Again, the funeral offerings of food, clothing, weapons, etc., to the dead are absolutely intelligible and purposeful among savage races, who believe that the souls of the departed are ethereal beings, capable of consuming food, and of receiving and using the souls or phantoms of any objects sacrificed for their use. The primitive philosophy to which these conceptions belong has to a great degree been discredited by modern science; yet the clear survivals of such ancient and savage rites may still be seen in Europe, where the Bretons leave the remains of the All Souls' supper on the table for the ghosts of the dead kinsfolk to partake of, and Russian peasants set out cakes for the ancestral manes on the ledge which supports the holy pictures, and make dough ladders to assist the ghosts of the dead to ascend out of their graves and start on their journey for the future world; while other provision for the same spiritual journey is made when the coin is still put in the hand of the corpse at an Irish wake. In like manner magic still exists in the civilized world as a survival from the savage and barbaric times to which it originally belongs, and in which is found the natural source and proper home of utterly savage practices still carried on by ignorant peasants in our own country, such as taking omens from the cries of animals, or bewitching an enemy by sticking full of pins and hanging up to shrivel in the smoke an image or other object, that similar destruction may fall on the hated person represented by the symbol (Tylor, *Primitive Culture*, chap. i., iii. iv., xi., xii.; *Early Hist. of Man*, chap. vi.).

To conclude, the comparative science of civilization thus not only generalizes the data of history, but supplements its information by laying down the lines of development along [33] which the lowest prehistoric culture has gradually risen to the highest modern level. Among the most clearly marked of these lines is that which follows the succession of the stone, bronze, and iron ages. The stone age represents the early

condition of mankind in general, and has remained in savage districts up to modern times, while the introduction of metals need not at once supersede the use of the old stone hatchets and arrows, which have often long continued in dwindling survival by the side of the new bronze and even iron ones. The bronze age had its most important place among ancient nations of Asia and Europe, and among them was only succeeded after many centuries by the iron age; while in other districts, such as Polynesia and Central and South Africa, and America (except Mexico and Peru) the native tribes were moved directly from the stone to the iron age without passing through the bronze age at all. Although the three divisions of savage, barbaric, and civilized man do not correspond at all perfectly with the stone, bronze, and iron ages, the classification of civilization by Nilsson and Thomsen has proved a guide of extraordinary value in arranging in their proper order of culture the nations of the Old World. Another great line of progress has been followed by tribes passing from the primitive state of the wild hunter, fisher, and fruit-gatherer, to that of the settled tiller of the soil, for to this change of habit may be plainly in great part traced the expansion of industrial arts and the creation of higher social and political institutions. these, again, have followed their proper lines along the course of time. Among such are the immense legal development by which the primitive law of personal vengeance passed gradually away leaving but a few surviving relics in the modern civilized world, and being replaced by the higher doctrine that crime is an offence against society, to be repressed for the public good. Another vast social change has been that from the patriarchal condition, in which the unit is the family of the despotic rule of its head, to the systems in which the individuals make up a society whose government is centralized in a chief or king. In the growth of systematic civilization, the art of writing has had an influence so intense, that of all tests to distinguish the barbaric from the civilized state, none is so generally effective as this, whether they have but the failing link with the past that mere memory furnishes, or can have recourse to written records of past history and written constitutions of present order. Lastly, still following the main lines of human culture, the primitive germs of religious institutions have to be traced in the childish faith and rude rites of savage life, and thence followed in their expansion into the vast systems administered by

patriarchs and priests, henceforth taking under their charge the precepts of morality and enforcing them under divine sanction, while also exercising in political life, an authority beside or above the civil law. These illustrations may suffice to make it clear that although the science of culture is still but rudimentary and imperfect, it indicates the one sound and indispensable method for the study of human arts and institutions, that of placing each at its proper stage in a line of evolution, and explaining it by the action of new conditions upon the previous stage whence it was derived.