

THE BRITISH ASSOCIATION.

SECTION H.

ANTHROPOLOGY.

OPENING ADDRESS BY E. W. BRABROOK, C.B., F.S.A.,
PRESIDENT OF THE SECTION.

I AM very sensible of the honour of presiding over this Section at a Bristol meeting. Bristol, from its association with the memory of J. C. Prichard, may be regarded as the very birth-place of British anthropology.

In submitting to this Section some observations on the past progress and the present position of the Anthropological Sciences, I use the plural term, which is generally adopted by our French colleagues, in order to remind you that Anthropology is in fact a group of sciences. There is what in France is called pure anthropology or anthropology proper, but which we prefer to call physical anthropology—the science of the physical characters of man, including anthropometry and craniology, and mainly based upon anatomy and physiology. There is comparative anthropology, which deals with the zoological position of mankind. There is prehistoric archaeology, which covers a wide range of inquiry into man's early works, and has to seek the aid of the geologist and the metallurgist. There is psychology, which comprehends the whole operations of his mental faculties. There is linguistics, which traces the history of human language. There is folk-lore, which investigates man's traditions, customs, and beliefs. There are ethnography, which describes the races of mankind, and ethnology, which differentiates between them, both closely connected with geographical science. There is sociology, which applies the learning accumulated in all the other branches of anthropology to man's relation to his fellows, and requires the co-operation of the statistician and the economist. How can any single person master in its entirety a group of sciences which covers so wide a field, and requires in its students such various faculties and qualifications? Here, if anywhere, we must be content to divide our labours. The grandeur and comprehensiveness of the subject are among its attractions. The old saying, "I am a man, and therefore I think nothing human to be foreign to me," expresses the ground upon which the anthropological sciences claim for us a special attention.

I may illustrate what I have said as to the varied endowments of anthropologists by a reference to the names of four distinguished men who have occupied in previous years the place which it falls to my lot to fill to-day—most unworthily, as I cannot but acknowledge, when I think of their pre-eminent qualifications. When the Association last met at Bristol, in 1875, Anthropology was not a Section, but only a Department, and it was presided over by Rolleston. There may be some here who recollect the address he then delivered, informed from beginning to end with that happy and playful wit which was characteristic of him; but all will know how great he was in anatomy, what a wide range of classical and other learning he possessed, and how he delighted to bring it to bear on every anthropological subject that was presented to his notice. In 1878 Huxley was the Chairman of this Department. It is only necessary to mention the name of that illustrious biologist to recall to your memory how much anthropology owes to him. Eight years before, he had been President of the Association itself, and seven years before that had published his "Evidence as to Man's Place in Nature." Brilliant as his successes were in other branches of scientific investigation, I cannot but think that anthropology was with him a favourite pursuit. His writings upon that subject possess a wonderful charm of style. In 1883 the Chairman was Pengelly, who for many years rendered service to anthropology by his exploration of Kent's Cavern and other caves, and who happily illustrated the close relation that exists between geology and anthropology. His biography, recently published, must have reminded many of us of the amiable qualities which adorned his character. Finally, in 1886, two years after anthropology had become a Section, its President was Sir George Campbell, a practical ethnologist, a traveller, an administrator, a legislator, a geographer, who passed through a long career of public life with honour and distinction. All my other predecessors are, I am glad to say, still living, and I make no mention of them. The few names I have cited—selected by the accidental circumstance that they are no longer with us—are sufficient to show what varied gifts and pursuits are combined in the study of anthropology.

NO. 1509, VOL. 58]

There is another side to the question. Great as is the diversity of the anthropological sciences, their unity is still more remarkable. The student of man must study the whole man. No true knowledge of any human group, any more than of a human individual, is obtained by observation of physical characters alone. Modes of thought, language, arts and history must also be investigated. This simultaneous investigation involves in each case the same logical methods and processes. It will in general be attended with the same results. If it be true that the order of the Universe is expressed in continuity and not in cataclysm, we shall find the same slow but sure progress evident in each branch of the inquiry. We shall find that nothing is lost, that no race is absolutely destroyed, that everything that has been still exists in a modified form, and contributes some of its elements to that which is. We shall find that this, which no one doubts in regard to physical matters, is equally true of modes of thought. We may trace these to their germs in the small brain of the palæolithic flint-worker; or, if we care to do so, still farther back. This principle has, as I understand, been fully accepted in geology and biology, and throughout the domain of physical science—what should hinder its application to anthropology? It supplies a formula of universal validity, and cannot but add force and sublimity to our imagination of the wisdom of the Creator. It is little more than has been expressed in the familiar words of Tennyson:—

"Yet I doubt not thro' the ages one increasing purpose runs,

And the thoughts of men are widen'd with the process of the suns;"

and supports his claim to be "the heir of all the ages, in the foremost files of time."

I propose, in briefly drawing your attention to some recent contributions to our knowledge, to use this as a convenient theory and as pointing out the directions in which further investigation may be rewarded by even fuller light.

Applying it, first of all, to the department of physical anthropology, we are called upon to consider the discovery by Dr. Dubois in Java of the remains of an animal called by him *Pithecanthropus erectus*, and considered by some authorities to be one of the missing links in the chain of animal existence which terminates in man. In his presidential address to this Association last year, Sir John Evans said, "Even the *Pithecanthropus erectus* of Dr. Eugène Dubois from Java meets with some incredulous objectors from both the physiological and the geological sides. From the point of view of the latter the difficulty lies in determining the exact age of what are apparently alluvial beds in the bottom of a river valley." In regard to these objections, it should be remembered that though the skull and femur in question are the only remains resembling humanity discovered in the site, it yielded a vast number of fossil bones of other animals, and that any difficulty in settling the geological age must apply to the whole results of the exploration. The physiological difficulties arise in two points—do the skull and femur belong to the same individual? are they or either of them human, or simian, or intermediate? As to the first, it is true that the two bones were separated by a distance of about fifty feet, but as they were found precisely on the same level, accompanied by no other bones resembling human bones, but by a great number of animal remains, apparently deposited at the same moment, the theory that they belonged to different individuals would only add to the difficulty of the problem. With regard to the skull, a projection of its outline on a diagram comparing it with others of low type belonging to the stone age shows it to be essentially inferior to any of them. With regard to the thigh, you will recollect that at the Liverpool meeting of this Section, Dr. Hepburn displayed a remarkable collection of femora from the anatomical museum of Edinburgh University, exhibiting pathological and other conditions similar to those in the femur of Trinil. Though this evidence tends to show that the bone is human, it is not inconsistent with, but on the contrary goes to support, the conclusion that it belongs to an exceedingly low and ancient type of humanity. Whether, therefore, we call the remains *Pithecanthropus erectus* with their discoverer, or *Homo pithecanthropus* with Dr. Manouvrier, or *Homo javanensis primigenius* with Dr. Houzé, we are in presence of a valuable document in the early evolution of mankind.

One element of special interest in this discovery is that it brings us nearer than we have ever been brought before to the time when man or his predecessor acquired the erect position. I believe that it is acknowledged by all that the femur belonged

to an individual who stood upright, and I presume that the capacity of the skull being greater than that of any known anthropoid is consistent with the same inference. The significance of that has been most clearly set forth by my predecessor, Dr. Munro, in his address to this Section at Nottingham in 1893. He showed that a direct consequence of the upright position was a complete division of labour as regards the functions of the limbs—the hands being reserved for manipulation and the feet for locomotion; that this necessitated great changes in the general structure of the body, including the pelvis and the spinal column; that the hand became the most complete and effective mechanical organ nature has produced; and that this perfect piece of mechanism, at the extremity of a freely moving arm, gives man a superiority in attack and defence over other animals. Further, he showed that, from the first moment that man recognised the advantage of using a club or a stone in attack or defence, the direct incentive to a higher brain development came into existence. The man who first used a spear tipped with a sharp flint became possessed of an irresistible power. In his expeditions for hunting, fishing, gathering fruit, &c., primitive man's acquaintance with the mechanical powers of nature would be gradually extended; and thus from this vantage point of the possession of a hand, language, thought, reasoning, abstract ideas would gradually be acquired, and the functions of the hand and the brain be developed in a corresponding manner. I do injustice to Dr. Munro's masterly argument by stating it thus crudely and briefly. It amounts to this—once the erect position is obtained, the actions of man being controlled by a progressive brain, everything follows in due course.

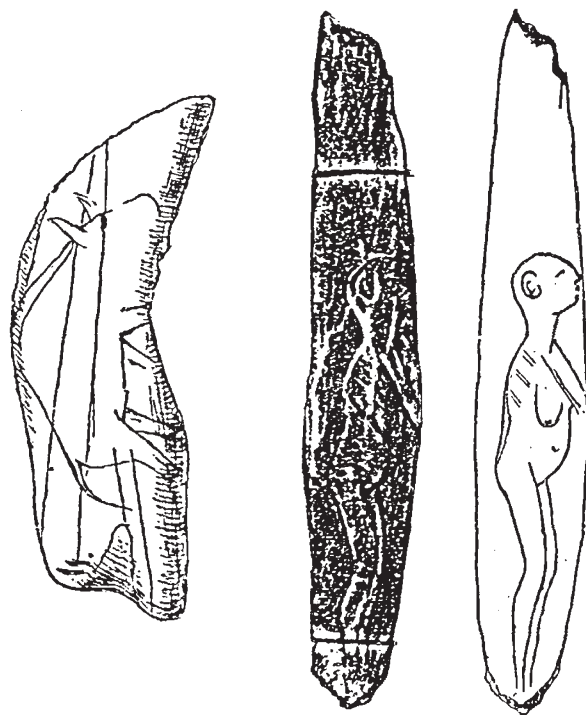
The next stage which we are yet able to mark with certainty is the palæolithic, but there must have been a great many intermediate stages. Before man began to make any implements at all, there must have been a stage of more or less length, during which he used any stick or stone that came to his hands without attempting to fashion the one or the other. Before he acquired the art of fashioning so elaborate an implement as the ordinary palæolithic axe or hammer, there must have been other stages in which he would have been content with such an improvement on the natural block of flint as a single fracture would produce, and would proceed to two or three, or more fractures by degrees. It must have been long before he could have acquired the eye for symmetry and the sense of design, of adaptation of means to ends, which are expressed in the fashioning of a complete palæolithic implement. It is probable that such rude implements as he would construct in this interval would be in general hardly distinguishable from flints naturally fractured. Hence the uncertainty that attaches to such discoveries of the kind as have hitherto been made public. Prof. McKenny Hughes, who speaks with very high authority, concludes a masterly paper in the *Archæological Journal* with the statement that he has "never yet seen any evidence which would justify the inference that any implements older than palæolithic have yet been found." The name "palæolith" which had been suggested for pre-palæolithic implements seems to him unnecessary at present, as there is nothing to which it can be applied; and as it will be long before it can be asserted that we have discovered the very earliest traces of man, he thinks it will probably be long before the word is wanted. An elaborate work on the ruder forms of implement, just published by M. A. Thieullen, of Paris, who has for many years been engaged in collecting these objects, adds materially to our knowledge of the subject.

Another line of argument bearing strongly in the same direction is afforded by the discovery in various places of works of art fabricated by early man. The statuettes from Brassempouy, the sculptures representing animals from the Bruniquel, the well-known figure of the mammoth engraved on a piece of ivory from Périgord, and many other specimens of early art attest a facility that it is not possible to associate with the dawn of human intelligence. M. Salomon Reinach tells an amusing story. A statuette in steatite of a woman, resembling in some respects those of Brassempouy, was discovered in one of the caverns of Mentone, as far back as 1884, but when the discoverer showed it to a personage in the locality, that authority advised him not to let it be seen, lest it should take away from the belief in the antiquity of the caves, it being then thought too artistic to be consistent with early man. The finder acted on this advice, in ignorance of the real interest of the statuette, until April 1896, when he showed it to M. Reinach and M.

Villenoisy, who promptly interviewed the sage adviser in question, and obtained a confirmation of the statement. Some interesting additions to our gallery of prehistoric art have been recently made by M. Emile Rivière and M. Berthoumeyrou, at Cro-Magnon in the Dordogne. These are a drawing of a bison and another of a human female in profile, which M. Rivière has kindly allowed me to reproduce. Among the other objects found in the same place were some flint implements brought to a fine point, suitable for engraving on bone or horn.

The idea of making in any form a graphic representation of anything seen has never, so far as I know, occurred to any lower animal; and it could hardly have been among the first ideas formed in the gradually developing human brain. When that idea is found carried out with remarkable artistic skill, by means of implements well adapted for the purpose, we may surely assume that the result was not obtained till after a long interval of time, and was approached by gradual steps marked by progress in other faculties, as well as in the artistic faculty. It may be that some day all uncertainty on this head will be removed by decisive discoveries.

The interval between the Palæolithic and Neolithic periods rests in the like condition of incertitude. That by some means,



and somewhere on the face of the globe, the one period gradually passed into the other we cannot but believe. That the transition between them may have involved innumerable degrees is also highly probable. Where and when, and how each step was taken we do not know at present, and possibly never shall know. The problem is not satisfactorily solved by the production of palæolithic implements resembling neolithic forms, or neolithic implements resembling palæolithic forms; inasmuch as between the one period and the other an interval of time involving geological and other changes has to be accounted for.

In this respect, also, our best authorities are the most cautious and conservative. In the excellent address which Prof. Boyd Dawkins delivered to the Royal Archæological Institute at the Dorchester meeting last year, on the present phase of prehistoric archæology, he contrasted the few primitive arts, such as sewing, and the manufacture of personal ornaments and rude implements of the chase, possessed by the palæolithic hunters—apart from their great proficiency in the delineation of animals—with the variety of arts, such as husbandry, gardening, spinning, weaving, carpentry, boat-building, mining, and pottery-making, possessed by the neolithic herdsmen, and held that between the

two there is a great gulf fixed. Somewhere that gulf must be bridged over. Prof. Boyd Dawkins says that the bridge is not to be found in the caverns of the South of France. It is difficult to meet his argument that the presence of grains of barley and stones of the cultivated plum at Mas d'Azil are evidences of neolithic civilisation. His objections to other discoveries are not so strong as this, but are strong enough to make us pause. The tall, long-headed, people whose remains were found at Cro-Magnon, he holds to be early neolithic and not palæolithic, to stand on the near side and not on the far side of the great gulf.

These considerations lend importance to the discoveries which have been laid before this Association at previous meetings by Mr. Seton-Kerr, and which have also been commented upon by Prof. Flinders Petrie and Sir John Evans. If we are compelled to admit a breach of continuity in Europe, is it in Africa that we shall find the missing links? That is another of the great problems yet unsolved. The evidence we want relates to events which took place at so great a distance of time that we may well wait patiently for it, assured that somewhere or other these missing links in the chain of continuity must have existed and probably are still to be found.

The next stage, which comprises the interval between the neolithic and the historic periods, was so ably dealt with by Mr. Arthur J. Evans in his address to this Section at the Liverpool meeting, that it does not call for any observations from me. Two Committees appointed by the Association in connection with this Section touch upon this interval—the Committee for investigating the lake dwellings at Glastonbury, and the Committee for co-operating with the explorers of Silchester in their well-conducted and fruitful investigation of the influence of Roman civilisation on a poor provincial population. I pass on to consider the very great progress that has been made of late years in some of the branches of anthropology other than physical and prehistoric, and especially in that of folk-lore. I do this the more readily because I do not recollect that folk-lore has ever before been prominently referred to in an address to this Section. It is beginning to assert itself here, and will in time acquire the conspicuous position to which it is becoming entitled, for the British Association is sensitive to every scientific movement, and responds readily to the demands of a novel investigation. Already, for three or four years, a day has been given at our meetings to folk-lore papers; and at the Liverpool meeting an exceeding philosophic, and at the same time practical, paper was read by Mr. Gomme, and is printed *in extenso* in the *Proceedings* as an Appendix to the Report of the Ethnographic Survey Committee. The term "folk-lore" itself is not without a certain charm. It is refreshing to find a science described by two English syllables instead of by some compound Greek word. The late Mr. W. J. Thoms had a happy inspiration when he invented the name. It is just twenty years since the Folk-lore Society was established under his direction. It has accumulated a vast amount of material, and published a considerable literature; it is now rightly passing from the stage of collection to that of systematisation, and the works of Mr. J. G. Frazer, Mr. E. Sidney Hartland, and others, are pointing the way towards researches of the most absorbing interest and the greatest practical importance.

A generalisation for which we are fast accumulating material in folk-lore is that of the tendency of mankind to develop the like fancies and ideas at the like stage of intellectual infancy. This is akin to the generalisation that the stages of the life of an individual man present a marked analogy to the corresponding stages in the history of mankind at large; and to the generalisation that existing savage races present in their intellectual development a marked analogy to the condition of the earlier races of mankind. The fancies and ideas of the child resemble closely the fancies and ideas of the savage, and the fancies and ideas of primitive man.

An extensive study of children's games, which had been entered into and pursued by Mrs. Gomme, has been rewarded by the discovery of many facts bearing upon these views. A great number of these games consist of dramatic representations of marriage by capture and marriage by purchase—the idea of exogamy is distinctly embodied in them. You will see a body of children separate themselves into two hostile tribes, establish a boundary line between them, demand the one from the other a selected maiden, and then engage in conflict to determine whether the aggressors can carry her across the boundary or the defenders retain her within it.

There can be little doubt that these games go back to a high antiquity, and there is much probability that they are founded upon customs actually existing, or just passing away at the time they were first played. Games of this kind pass down with little change from age to age. Each successive generation of childhood is short: the child who this year is a novice in a game becomes next year a proficient, and the year after an expert, capable of teaching others, and proud of the ability to do so. Even the adult recollects the games of childhood and watches over the purity of the tradition. The child is ever a strong conservative.

Upon the same principle, next to children's games, children's stories claim our attention. Miss Roalfe Cox has collected, abstracted, and tabulated not fewer than 345 variants of Cinderella, Catskin, and Cap o' Rushes. These come from all four quarters of the globe, and some of them are recorded as early as the middle of the sixteenth century. These elaborate stories are still being handed down from generation to generation of children, as they have been for countless generations in the past. Full of detail as they are, they may be reduced to a few primitive ideas. If we view them in their wealth of detail, we shall deem it impossible that they could have been disseminated over the world as they are otherwise than by actual contact of the several peoples with each other. If we view them in their simplicity of idea, we shall be more disposed to think that the mind of man naturally produces the same result in the like circumstances, and that it is not necessary to postulate any communication between the peoples to account for the identity. It does not surprise us that the same complicated physical operations should be performed by far distant peoples without any communication with each other: why should it be more surprising that mental operations, not nearly so complex, should be produced in the same order by different peoples without any such communication? Where communication is proved or probable, it may be accepted as a sufficient explanation; where it is not provable, there is no need that we should assume its existence.

The simple ideas which are traceable in so many places and so far back are largely in relation with that branch of mythology which personifies the operations of nature. Far be it from me to attempt to define the particular phase of it which is embodied in the figure of Cinderella as she sits among the ashes by the hearth, or to join in the chase after the solar myth in popular tradition. The form of legend which represents some of the forces of nature under the image of a real or fictitious hero capable of working wonders appears to be widely distributed. Of such, I take it, are the traditions relating to Glooscap, which the late Dr. S. T. Rand collected in the course of his forty years' labours as a missionary among the Micmac Indians of Nova Scotia, where, Mr. Webster says, Glooscap formerly resided. The Indians suppose that he is still in existence, although they do not know exactly where. He looked and lived like other men; ate, drank, smoked, slept and danced along with them; but never died, never was sick, never grew old. Cape Blomidon was his home, the Basin of Minas his beaver-pond. He had everything on a large scale. At Cape Split he cut open the beaver dam, as the Indian name of the cape implies, and to this we owe it that ships can pass there. Spencer's Island was his kettle. His dogs, when he went away, were transformed into two rocks close by. When he returns he will restore them to life. He could do anything and everything. The elements were entirely under his control. You do not often meet with a mischievous exercise of his power. It is a curious part of the tradition, possibly a late addition to it, that it was the encroachments and treachery of the whites which drove him away.

The early inhabitants of the island of Tahiti appear to have had a whole pantheon of gods and heroes representing the various operations of nature. Even the Papuans have a legend in which the morning star is personified acting as a thief. But it is needless to multiply instances. Lord Bacon—who says "The earliest antiquity lies buried in silence and oblivion. . . . This silence was succeeded by poetical fables, and these at length by the writings we now enjoy; so that the concealed and secret learning of the ancients seems separated from the history and knowledge of the following ages by a veil or partition wall of fables interposing between the things that are lost and those that remain"—has shown in his "Wisdom of the Ancients" that classical mythology was in truth a vast system of nature-worship, and in so doing has done more than even he knew,

for he has affiliated it to those ideas which have been so commonly formed among rude and primitive peoples. It is true, he says, fables in general are composed of ductile matter, that may be drawn into great variety by a witty talent or an inventive genius, and be delivered of plausible meanings which they never contained. But the argument of most weight with him, he continues, "is that many of these fables by no means appear to have been invented by the persons who relate and divulge them, whether Homer, Hesiod, or others; but whoever attentively considers the thing will find that these fables are delivered down and related by those writers, not as matters then first invented and proposed, but as things received and embraced in earlier ages. The relators drew from the common stock of ancient tradition, and varied but in point of embellishment, which is their own. This principally raises my esteem of these fables, which I receive, not as the product of the age, or invention of the poets, but as sacred relics, gentle whispers, and the breath of better times, that from the traditions of more ancient nations came, at length, into the flutes and trumpets of the Greeks."

Except that he supposes them to be a relic of better times, the poet's dream of a golden age no doubt still ringing in his ears, Bacon had, in this as in many other matters, a clear insight into the meaning of things.

Another idea that appears among very early and primitive peoples, and has had in all time a powerful influence on mankind, is that of a separable spirit. The aborigines of North-west Central Queensland, who have lately been studied to such excellent purpose by Dr. Walter Roth, the brother of a much-esteemed past officer of this Section, are in many respects low in the scale of humanity; yet they possess this idea. They believe that the ghost, or shade, or spirit of some one departed can so initiate an individual into the mysteries of the craft of doctor or medicine-man as to enable him, by the use of a death-bone apparatus, to produce sickness and death in another. This apparatus is supposed to extract blood from the victim against whom it is pointed without actual contact, and to insert in him some foreign substance. They will not go alone to the grave of a relative for fear of seeing his ghost. It appears that they have the fancy that Europeans are ghosts. The Tasmanians also, as Mr. Ling Roth himself tells us, had the same fancy as to the Europeans, and believed that the dead could act upon the living. The Pawnee Indians, we are assured by Mr. Grinnell, believe that the spirits of the dead live after their bodies are dust. They imagine that the little whirlwinds often seen in summer are ghosts. The Blackfeet think the shadow of a person is his soul, and that while the souls of the good are allowed to go to the sand-hills, those of the bad remain as ghosts near the place where they died. The Shillooks of Central Africa are said to believe that the ghostly spectres of the dead are always invisibly present with the living, and accompany them wherever they go. The aborigines of Samoa believed in a land of ghosts, to which the spirits of the deceased were carried immediately after death. The religious system of the Amazulu, as described by Bishop Callaway, rests largely on the foundation of belief in the continued activity of the disembodied spirits of deceased ancestors.

Mr. Bryce, in his "Impressions of South Africa," says that at Lezapi, in MASHONLAND, are three huts, one of which is roofed, and is the grave of a famous chief, whose official name was Makoni. "On the grave there stands a large earthenware pot, which used to be regularly filled with native beer when, once a year, about the anniversary of his death, his sons and other descendants came to venerate and propitiate his ghost. Five years ago, when the white men came into the country, the ceremony was disused, and the poor ghost is now left without honour and nutriment. The pot is broken, and another pot, which stood in an adjoining hut, and was used by the worshippers, has disappeared. The place, however, retains its awesome character, and a native boy who was with us would not enter it. The sight brought vividly to mind the similar spirit worship which went on among the Romans, and which goes on to-day in China; but I could not ascertain for how many generations back an ancestral ghost receives these attentions—a point which has remained obscure in the case of Roman ghosts also."

The aborigines of New Britain are said to believe that the ghosts of their deceased ancestors exercise a paramount influence on human affairs, for good or for evil. They have the poetical idea that the stars are lamps held out by the ghosts to

light the path of those who are to follow in their footsteps. On the other hand, they think these ancestral ghosts are most malicious during full moon. Not to multiply instances, we may say with Mr. Staniland Wake, it is much to be doubted whether there is any race of uncivilised men who are not firm believers in the existence of spirits or ghosts. If this is so, and the idea of a separable spirit, capable of feeling and of action apart from the body, is found to be practically universal among mankind, and to have been excogitated by some of the least advanced among peoples; and if we observe how large a share that idea has in forming the dogmas of the more specialised religions of the present day, we shall not see anything inherently unreasonable in the generalisation that the group of theories and practices which constitute the great province of man's emotions and mental operations expressed in the term "religion" has passed through the same stages and produced itself in the same way from these early rude beginnings of the religious sentiment as every other mental exertion. We shall see in religion as real a part of man's organisation as any physical member or mental faculty. We shall have no reason to think that it is an exception to any general law of progress and of continuity which is found to prevail in any other part of man's nature.

The same inference may be drawn from many other considerations. Take, for instance, the belief in witchcraft, which is so characteristic of uncivilised man that it is hardly necessary to cite examples of it. The Rev. Mr. Coillard, a distinguished missionary of the Evangelical Society of Paris, in a delightful record, which has just been published, of his twenty years' labours as a missionary pioneer among the Banyai and Barotzi of the Upper Zambesi, "on the threshold of Central Africa," says: "In the prison of the Barotzi, toiling at earthworks, is a woman—young, bright, and intelligent. She told me her story. A man of remarkably gentle character had married her. The king's sister, Katoka, having got rid of one of her husbands, cast her eyes on this man and took him. He had to forsake his young wife—quite an easy matter. Unfortunately, a little later on, a dead mouse was found in the princess's house. There was a great commotion, and the cry of witchcraft was raised. The bones did not fail to designate the young woman, and she was made a convict. A few years ago she would have been burnt alive. Ah, my friends, paganism is an odious and a cruel thing!" Ah, Mr. Coillard, is it many years ago that she would have been burnt alive or drowned in Christian England or Christian America? Surely the odiousness and the cruelty are not special to paganism any more than to Christianity. The one and the other are due to ignorance and superstition, and these are more hateful in a Matthew Hale or a Patrick Henry than in a Barotzi princess in the proportion that they ought to have been more enlightened and intelligent than she. It is only 122 years since John Wesley wrote: "I cannot give up to all the Deists in Great Britain the existence of witchcraft"; and I believe that to this day the Order of Exorcists is a recognised order in the Catholic Church.

The same line of argument—which, of course, I am only indicating here—might be pursued, I am persuaded, in numberless other directions. Mr. Frazer, in his work on the Golden Bough, has most learnedly applied it to a remarkable group of beliefs and observances. Mr. Hartland has followed up that research with a singularly luminous study of several other groups of ideas in the three volumes of his "Legend of Perseus." More recently, Mr. Andrew Lang has sought to show that the idea of a Supreme Being occurs at an earlier stage in the development of savage thought than we had hitherto supposed. Striking as these various collocations of facts and the conclusions drawn from them may appear, I am convinced there is much more for the folk-lorist to do in the same directions.

The principle that underlies it all seems to be this: man can destroy nothing, man can create nothing, man cannot of his own mere volition even permanently modify anything. A higher power restrains his operations, and often reverses his work. You think you have exterminated a race: you have put to the sword every male you can find, and you have starved and poisoned all the survivors of the community. In the meanwhile, their blood has been mingled with yours, and for generations to come your bones and those of your descendants will preserve a record of that lost race. You think you have exterminated a religion; you have burned to death all of its teachers you can find, and converted forcibly or by persuasion the rest of the community. But you cannot control men's thoughts, and the old beliefs and

habits will spring up again and again, and insensibly modify your own religion, pure as you may suppose it to be.

Huxley, in his address to the department of Anthropology twenty years ago, said, with the force and candour that were characteristic of him: "Anthropology has nothing to do with the truth or falsehood of religion—it holds itself absolutely and entirely aloof from such questions—but the natural history of religion, and the origin and the growth of the religions entertained by the different kinds of the human race, are within its proper and legitimate province." I do not presume to question that as an absolutely accurate definition of the position—it could not be otherwise; but if there be any here to whom what I have been suggesting is in any sense novel or startling, I should be glad to be allowed to say one word of reassurance to them. When my friend Mr. Clodd shocked some of the members of the Folk-lore Society by his frank statement of conclusions at which he had arrived, following the paths I have indicated, it was said we must fall back on the evidences of Christianity. What more cogent evidence of Christianity can you have than its existence? It stands to-day as the religion which, in most civilised countries, represents that which has been found by the operation of natural laws to be best suited for the present circumstances of mankind. You are a Christian because you cannot help it. Turn Mahometan to-morrow—will you stop the spread of Christianity? Your individual renunciation of Christianity will be but a ripple on a wave. Civilised mankind holds to Christianity, and cannot but do so till it can find something better. This, it seems to me, is a stronger evidence of Christianity than any of the loose-jointed arguments I find in evidential literature.

Upon this thorny subject I will say no more. I would not have said so much, but that I wish to show that these considerations are not inconsistent with the respect I entertain, and desire now as always to express, for those feelings and sentiments which are esteemed to be precious by the great majority of mankind, which solace them under the adversities of life and nerve them for the approach of death, and which stimulate them to works of self-sacrifice and of charity that have conferred untold blessings on humanity. I reverence the divine Founder of Christianity all the more when I think of him as one who so well "knew what was in man" as to build upon ideas and yearnings that had grown in man's mind from the earliest infancy of the race.

To return. If continuity be the key that unlocks the receptacle where lie the secrets of man's history—physical, industrial, mental, and moral; if in each of these respects the like processes are going on—it follows, as I have already said, that the only satisfactory study of man is a study of the whole man. It is for this reason that I ask you to take especial interest in the proceedings of one of the Committees of this Section, which has adopted such a comprehensive study as the guiding principle of its work—I mean the Ethnographical Survey Committee. I have so often addressed this Section and the Conference of Corresponding Societies on the matter, since the Committee was first appointed at the Edinburgh meeting, on the suggestion of my friend Prof. Haddon, that I can hardly now refer to it without repeating what has been already said or forestalling what will be said when its report is presented to you, but its programme so fully realises that which has been in my mind in all that I have endeavoured to say that I must make one more effort to enlist your active interest in its work.

The scheme of the Committee includes the simultaneous recording in various districts of the physical characters, by measurement and by photography, the current traditions and beliefs, the peculiarities of dialect, the monuments and other remains of ancient culture, and the external history of the people. The places in the United Kingdom where this can be done with advantage are such only as have remained unaffected by the great movements of population that have occurred, especially of late years. It might have been thought that such places would be very few; but the preliminary inquiries of the Committee resulted in the formation of a list of between 300 and 400. So far, therefore, as the testimony of the very competent persons whose advice was sought by them is to be relied on, it is evident that there is ample scope for their work. At the same time, the process of migration from country to town is going on so rapidly, that every year diminishes the number of such places. One thinks with regret how much easier the work would have been one or two or three generations ago; but that consideration should only induce us to put it off no longer.

The work done by the lamented Dr. Walter Gregor for this Committee in Dumfriesshire and other parts of Scotland is an excellent type of the way in which such work should be done. His collections of physical measurements and of folk-lore have been published in the fourth and fifth reports of the Committee. There can be no doubt that few men possess the faculty he had of drawing forth the confidence of the villagers and getting them to tell him their superstitions and their old customs. He succeeded in recording from their lips not fewer than 733 items of folk-lore. They not merely form exceedingly pleasant reading, such as is perhaps not often met with in a British Association report, but they also will be found to throw considerable light on the views which I have ventured to lay before you. It is much to be wished that others who have the like faculty, if even in a lesser degree, could be induced to take up similar work in other districts, now that Dr. Gregor has so well shown the way in which it ought to be done.

The work done by the Committee for the Ethnographical Survey of Canada; the completion of the Ethnographical Survey of the North-western tribes which has been ably conducted for many years; and the progress made in the Ethnographical Survey of India will also be brought under your notice, the latter in a paper by Mr. Crooke, who has worked with Mr. Risley upon it.

Another movement, which was originated by this Section at the Liverpool meeting, and was referred to in the report of the Council of the Association last year, has made some progress since that report was presented. Upon the recommendation of this Section, the General Committee passed the following resolution and referred it to the Council for consideration and action:—

"That it is of urgent importance to press upon the Government the necessity of establishing a Bureau of Ethnology for Greater Britain, which, by collecting information with regard to the native races within and on the borders of the Empire, will prove of immense value to science and to the Government itself."

The Council appointed a Committee, consisting of the President and General Officers, with Sir John Evans, Sir John Lubbock, Prof. Tylor, and your esteemed Vice-President, Mr. Read, the mover of the resolution. Their report is printed at length in last year's Report of Council, and shows clearly how useful and how easily practicable the establishment of such a Bureau would be. The Council resolved that the Trustees of the British Museum be requested to consider whether they could allow the proposed Bureau to be established in connection with the Museum. I understand that those Trustees have returned a favourable answer; and I cannot doubt that the joint representations which they and this Association will make to Her Majesty's Government will result in the adoption of a scheme calculated to realise all the advantages which we in this Section have so long looked for from it. In the Secretary of State for the Colonies and the Chancellor of the Exchequer we have statesmen who cannot fail to appreciate the benefits the community must derive from acquiring accurate and scientific knowledge of the multifarious races which compose the Empire.

Those of us who visited the United States last year had the opportunity of observing the excellent work which is done by the Bureau of Ethnology at Washington, and those who stayed at home are probably familiar with the valuable publications of that department. An Act of Congress twenty years ago appropriated 4000*l.* a year to the Smithsonian Institution for the continuance of researches in North American anthropology. The control of the Bureau was entrusted to the able hands of Major Powell, who gathered round him a band of skilled workers, many of whom had been previously engaged on ethnographic research under the direction of the Geographical and Geological Survey of the Rocky Mountain region. In field work and in office work, to use Major Powell's convenient distinction, ample return has ever since been rendered to the United States Government for the money thus appropriated, which has since been increased to 8000*l.* a year. Our own Bureau of Ethnology would have a wider sphere of operations, and be concerned with a greater number of races. It would tend to remove from us the reproach that has in too many cases not been without foundation—that we have been content to govern races by the strong hand without caring to understand them, and have thus been the cause of injustice and oppression from ignorance rather than from malevolence. If that were only a record of the past, we might be content with mere unavailing regret; but the colonial

empire is still expanding, and we and our competitors in that field are still absorbing new districts—a practice which will probably continue as long as any spot of ground remains on the face of the globe occupied by an uncivilised race.

Would it not be worth while at this juncture to extend to the peoples of Africa, for instance, the principles and methods of the Ethnographic Survey—to study thoroughly all their physical characters, and at the same time to get an insight into the working of their minds, the sentiments and ideas that affect them most closely, their convictions of right and wrong, their systems of law, the traditions of the past that they cherish, and the rude accomplishments they possess? If for such a service investigators like Dr. Roth, who began his researches in Queensland by so close a study of the languages and dialects of the people that he thoroughly won their confidence, could be found, the public would soon learn the practical value of anthropological research. If the considerations which I have endeavoured to urge upon you should lead not only the scientific student but the community at large to look upon that which is strange in the habits and ways of thinking of uncivilised peoples as representing with more or less accuracy a stage in that long continuity of mental progress without which civilised peoples would not be what and where they are, it could not but favourably affect the principles and practice of colonisation. *Tout comprendre c'est tout garder.* The more intimate our acquaintance with the races we have to deal with and to subjugate, the more we shall find what it means to stand with them on the same platform of common humanity. If the object of government be, as it ought to be, the good of the governed, it is for the governing race to fit itself for the task by laying to heart the lessons and adopting the processes of practical Anthropology.

PHYSICS AT THE BRITISH ASSOCIATION.

THE reputation for industry which Section A has acquired in past years will not suffer in any way by the proceedings of the recent meeting in Bristol. In addition to the ordinary meetings of the Section, the International Magnetic Conference met on four days; and as all communications to the Section relating to terrestrial magnetism and atmospheric electricity were referred to the Conference, it may be said that the Section sat in duplicate on five out of its six days of meeting. On Saturday, when the Magnetic Conference did not meet, the two departments were devoted to mathematics and meteorology respectively, and on Wednesday the Section was not divided. On two occasions the Section was associated with others in joint discussions, namely with Section B, on the results of the recent solar eclipse expeditions, and with Section G, on the magnetic and electrolytic effects of electric railways. The members of the International Magnetic Conference also took part in the latter discussion. The papers read before the Section were representative of almost every branch of physics. In the following account they are grouped according to subject, and are not arranged in the order in which they were read.

Before the commencement of his address the President, Prof. Ayrton, referred to the loss to science occasioned by the death of Dr. John Hopkinson. The address, which was published in NATURE of September 8, suggests a new field for physical and chemical research, namely the investigation of the phenomena of smell. For the physicist the most striking experiments described are those which show the slowness of diffusion of odorous particles in still air, and the absorption of scents by glass, while the physiologist cannot fail to be interested in the superior sense of smell possessed by the female sex. In moving a vote of thanks to the President, Lord Kelvin referred to the identity of the senses of taste and smell, including both as the chemical sense, and hoped Prof. Ayrton's address would lead to another bond of union between the chemist and the physicist. Prof. Mascart seconded the vote, specially thanking the President for his welcome to the members of the International Magnetic Conference.

In the subject of heat Prof. Rosa described the continuation of important work by himself and Prof. Atwater, the object being to determine whether the law of conservation of energy holds good for the vital processes going on in the human body. For this purpose a space large enough for a man to live in was enclosed as a calorimeter, and surrounded by alternate jackets of flowing water and air, in such a manner that the heat evolved

from the "calorimeter" could be accurately measured. The details of construction of the apparatus were described at the Toronto meeting last year. During the past twelve months the authors have made experiments on men living in the calorimeter for periods varying from four to eight days, and doing different kinds of work. The heat-value of the food supplied and of the excreta were obtained by combustion, and the amount and composition of the gases entering and leaving the calorimeter were also determined. A full description of the work is to be published by the United States Government, under whose auspices the experiments have been carried out; it may, however, be stated that the law of conservation of energy is found to be true within the limits of experimental error. The ratio of the mechanical work done by a man to the total energy supplied to him, that is to say his efficiency as an engine, is usually about 7 per cent., and may be as high as 10 per cent. These figures are higher than the efficiency of a perfect heat-engine working between the same limits of temperature, and lead us to the conclusion that the energy transformation in the human body is not effected solely by heat, but is most probably analogous to that in a circuit containing a battery and electromotor.

Another series of experiments to decide a question of theoretical interest was described in a paper by Dr. A. Galt, on the heat of combination of metals in the formation of alloys. Lord Kelvin has shown how a lower limit to the size of atoms may be found by comparing the work done by the approach of the electrical charges on a thin film of zinc and a thin film of copper, their difference of potential being that due to contact, with the heat of combination of the films to form brass. On the other hand Prof. Oliver Lodge has pointed out¹ that on the chemical theory of electromotive force of contact the heat of formation of an alloy should be much smaller than Lord Kelvin assumes it to be, and an exact determination of its value would form a crucial test between the rival contact and chemical theories. In Dr. Galt's experiments a thin glass bulb with holes in its sides contains the alloy or the mixed metals, and is lowered into a calorimeter of glass containing nitric acid; as the acid passes through the holes the metal is dissolved, and the evolved gases do not escape. The rise of temperature of the acid is noted, and the heat of combination calculated. The results are so far preliminary, and the Association has made a grant for their continuation. Mr. W. N. Shaw read a paper on Dalton's law, in which he called attention to Regnault's experiments on the pressure of mixtures of air and saturated ether vapour; these experiments show a discrepancy between the saturation pressure of ether in air and in a vacuum. The explanation afforded by Regnault is that errors are introduced owing to the condensation of vapour on the vertical walls of the barometer tube; but from experiments on mixtures of air and water-vapour, Mr. Shaw considers that a real departure from the law of Dalton is indicated. The subject is to be investigated in the Cavendish Laboratory. Dr. C. H. Lees described experiments on the thermal conductivity of rocks at different pressures, according to which the conductivities of slate, granite and marble are very slightly increased by increased pressure, while in the case of a rather soft sandstone the increase amounted to 3 per cent. under a pressure of about sixty atmospheres. Mr. S. R. Milner and Prof. Chattock read a paper on the thermal conductivity of water, which they find to be 0.00143 C.G.S. units at 20° C.

Among papers relating to light Mr. J. W. Gifford read a communication on lenses, not of glass, in which he compared the transparency of calcite, quartz and fluor-spar for extreme ultra-violet rays, the last-named being the most transparent. Lord Kelvin discussed the various theories of refraction and anomalous dispersion, and stated that none of the dynamical theories hitherto proposed is satisfactory or free from difficulties. Prof. T. Preston described his experiments on radiation in a magnetic field. Zeeman found that when the spectrum of the sodium light emitted from a source in a magnetic field is viewed at right angles to the lines of force, the bright lines are tripled and the polarisation of the side lines is in a plane perpendicular to that of the central line. By using a very large grating and photographing the lines, Prof. Preston finds that all bright lines in a spectrum are not treated alike; some are unchanged, some become doublets, triplets, quartets, or even sextets. He explained how absorption of the original radiation by vapour surrounding the source might account for the multiplication of lines, but he considers from the sharpness of definition of the lines that the effect is not due to absorption. Prof. S. P.

¹ *Philosophical Magazine*, vol. xix., 1885.