to keep the work within its assigned limits, but it is none the less a disappointment.

One of the most valuable features of the book — to the scientific ornithologist, at least — is the bringing together of previous records pertaining to the rarer birds. In almost all cases these have been exhaustively collated, a work chiefly, if not wholly, performed by Mr. Purdie, whose well-known fitness for the task is a practical guaranty of its thorough accomplishment.

The weakest spot in the structure is that of the editor's rulings on questions affecting the comparative abundance and seasonal distribution of the less-known birds. In many — far too many — cases, his conclusions are more or less unwarranted or premature; in not a few, they are positively and demonstrably erroneous. This was to be expected, however, in view of the fact that neither editor nor author is known to have had an extensive experience in New-England fields or woodlands; and, considering such limitations, it is chiefly remarkable that they have done so well.

But, despite its shortcomings, 'New-England bird-life,' as a whole, may be honestly characterized as a work of real merit and unquestioned utility. Its faults are seldom vital, its excellences many and obvious. Although a manual, rather than a comprehensive general treatise, it cannot fail to take a high and permanent place among the literature of North-American ornithology. To the student of New-England birds, it is sure to prove a valuable hand-book, adequate for the determination of most problems which the limited field is likely to furnish. There is still room, of course, for the more extensive structures which some future builders will doubtless rear on this substantial corner-stone.

Before concluding, we find it necessary to revert to a rather delicate subject, — that of the ostensible authorship of the book. In the preface to part i., the editor touches on this, as follows: —

"Mr. Stearns undertook this work several years ago, at the writer's suggestion, that such a treatise was much to be desired, and could not fail to subserve a useful purpose. Having been diligently revised from time to time, in the light of our steadily increasing knowledge, Mr. Stearns's manuscripts have been submitted to the editor's final corrections. In revising, and to some extent rewriting, them for publication, the editor has been influenced by the author's request that he would alter and amend at his own discretion."

Perhaps we are bound to accept this explanation literally; but the reader familiar with Dr. Coues's characteristic style and methods will find few traces of Mr. Stearns's alleged participation. Clearly the 'revising' was very thoroughly done. We might go even farther, and venture the surmise that Dr. Coues not only edited, but *wrote*, the entire book. But is this a matter with which we have any business to meddle? Probably not so far as Dr. Coues's interests are at stake. If he chooses to do all the work, and take less than half the credit, it is his own affair. Nevertheless, it certainly *is* our right to challenge a reputation unfairly won, and until further proofs are forthcoming we shall refuse to believe that Mr. Stearns's agency in 'New-England bird-life' has been much more than nominal. Perhaps the inside history of the book will never be made public, but intelligent ornithologists are likely to see through a millstone with a hole in the middle.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

PROCEEDINGS OF SECTION H. — ANTHROPOLOGY.

ADDRESS OF OTIS T. MASON OF WASHINGTON, D.C., VICE-PRESIDENT OF THE SECTION, AUG. 15, 1883.

THE SCOPE AND VALUE OF ANTHROPOLOGICAL STUDIES.

Every thing that comes before the human mind has to pass through a process of weighing and measuring, and receives a valuation according to the thinker's standards of merit. In this critical spirit let us pass in review those studies called anthropological, in order to form some estimate of their value according to the measures commonly applied to various departments of learning.

Anthropology is the application of the instrumentalities and methods of natural history to the inductive study of man. The anthropologist, in this sense, is not a dilettante philosopher, who inquires into old things because they are old, or into curious things while they are curious, omitting all the great movements and needs of society, and overloading the baggage-train of progress with trumpery picked up along the march. The practical spirit of our age demands that we ask what truth, or good, or beauty

comes from such investigations, and how we can make them subservient to human weal.

As to the scope of anthropology, we may be instructed by the work of others. The natural history of any species, say of the domestic horse, includes many inquiries, such as the time and place of its origin; its ancestry; its pristine size, appearance, and mode of living. We should afterwards inquire concerning the archeology or the paleontology of the Equidae, their embryology, anatomy, physiology, diseases, abnormalities, and external characteristics. Mr. Romanes would have a chapter on the intelligence of the animal, as to its nature and amount, supplementing the discussion with notes on the various ways in which the horse manifests its mind, its wills, emotions, and opinions. Horses do not construct elaborate houses like the ants and the beavers; but the members of all species occupy their daily lives in some habitual industries by means of which they wear out the excess of muscle. Sir John Lubbock would lead us farther, and show us that horses go in droves, follow a leader, plan migrations, attacks, and defence, amuse themselves, enjoy one another's company, improve in appearance, intelligence, and usefulness by cultivation, — in a thousand ways show themselves to be social creatures. At last Mr. Mivart would insist that the horse has its habitude (ἕξις), its manner of action, its economy (oecology), and its members are affected in a characteristic manner by heat, light, moisture, winds, the kind and quality and abundance of food and drink, by beneficial or injurious animal neighbors, and by the vital, procreative, inheritable energy with which they are endowed. These and many other kindred inquiries concerning this homogeneous group would constitute the science of hippology.

The conscientious devotee to this science would frequently ask himself what practical good would result from all this expenditure of time, thought, and resources necessary to collect specimens and facts, and to formulate his science. Could they be employed on some subject more ennobling and profitable to himself, better calculated to inform, enrich, and beatify mankind?

Now, instead of horses, let us substitute the *genus homo*, laying aside all predilections; and, if possible, let us imagine the student of anthropology to belong to quite another genus than the subject of his research. He would have, in the fourteen hundred millions of human beings now living on the earth, and the remains of their congeners slumbering in its bosom, perhaps the best defined group of animals. Calling them a genus or a species, as you like, they are so well hedged off from all other animal groups that not the least embarrassment has ever disturbed the naturalist in distinguishing the anthropos even from the anthropoid. No one was ever puzzled to tell, concerning any living thing, whether or not it was a human being. The earth has never yielded a bone concerning which the practical anatomist stood in doubt whether it had been once part of a human body.

Now, I take it for granted that any inquiry whatever which would be useful or entertaining respecting another species would be intensified in importance having man for its object. Indeed, there are few questions which naturalists are wont to propose to their groups which ought not to be carefully considered when we are studying man. Before entering upon the weighing process, therefore, it may make our task more easy if we consider the present scope of anthropology, and briefly pass in review some of the questions which are being propounded by anthropologists every day.

When did man first appear on earth, — at what time and in what geological horizon?

Have all the individuals of our race descended from a common human ancestry? in other words, are we monogenists, or polygenists?

Where was the birthplace of humanity?

What manner of creature was that first man in specific characteristics, in size, aspect, intelligence, and social condition? and how did he get here?

To all such queries, Haeckel aptly gives the name of anthropogeny: therefore, in order to be anthropologists we must be anthropogenists.

Another set of questions relates to that stretch of time which lies between the pristine man, or the pristine condition, and the beginnings of recorded history.

Have we complete, irrefragable evidence that our race has progressed from a brute-like condition, in which it was devoid of all experience and appliances?

What application must we make of Professor Tylor's belief that civilization has progressed upward like a column of vapor, some parts advancing while other parts are being rolled downward, but, on the whole, ascending and expanding?

Granting that there has been improvement, what paths have been pursued?

Speaking of our own peculiar province, what is the real import of such discoveries as those of Dr. Abbott and Professor Whitney in establishing the great antiquity and early rudeness of the American savage?

Who were the builders of the mounds, earthworks, cliff-dwellings, and the stone structures of Middle America?

What were the functions of these various edifices?

What credence is to be given to the early historians of American culture?

Already we have our schools of interpretation, such as the Bancroft school and the Morgan school. Where, among these opposing schemes, does the truth lie?

In the administration of this science, there is occupation for the greatest diversity of talent. The biologists of our time are entering into the minutest inspection of the life-history of each animal form. With enthusiasm the embryologists trace the modifications of structure as they succeed one another in the germ. Before their eyes the very play of creation is dimly shadowed, and organic structure built up. They pass their work on to the anatomists and physiologists. Now, the anthropologist must endeavor to comprehend the whole in its synthesis. As Newton and Laplace grasped the unity and organization of

the stellar world, as Humboldt gazed upon all created things as elements of the universal cosmos, as Darwin first conceived the consanguinity of all living beings and their mutual help or harm, so the anthropologist seeks to unite all that can be known respecting man into a comprehensive science, and to study the innumerable correlations which bind the most incongruous actions and thoughts together in harmony.

May we gain help, in solving questions of human origin, by carefully observing the evolution of the embryo?

Does a knowledge of the life history of the individual furnish a clew to the life history of the species?

What does a comparison of the anatomy of man with that of the quadrumana say respecting the genealogy of the species?

What are the proper methods and instruments of anthropometry, — observing the growth of children, the dimensions, angles, and curves of the cranium, the diversity and size of the brain according to age and sex and race, the weight of the body, the color of the skin, hair, and eyes, the muscular movements, the development of faculties, longevity, fecundity, plasticity under change of environment, and vigor? and what are the legitimate inferences to be drawn from such investigations?

Finally, by what devices can the multitudinous correlations of structure and function in the human body find expression in graphic methods?

Another set of observers must now be brought into this great laboratory. We have to deal with a group of animals in which intelligence has manifested itself to such a degree as to dominate all other functions. Teleological inquiries can be no longer excluded. Hitherto the application of scientific methods to the mind has required that we should be satisfied with sensuous results of thought, and forbidden us to inquire into the nature of the mind itself. Now, we are met at the outset with this puzzling question: Shall consciousness or introspection be admitted as an instrument of observation?

How are we to record its dicta? and how (to borrow a term from the astronomers) shall we eliminate the personal equation?

Or, if we are not in a position to admit introspection among our tools of observation, can we not invent some delicate apparatus by means of which the strength of feeling and the inmost thoughts may be known and measured?

Does the brain generate thought as the liver generates bile?

What can science tell us concerning the existence of a human soul, non-material, and not susceptible of measurement by the standards of well-known forces?

How does it come about that children inherit the traits, tendencies, and faculties of their progenitors?

By what routes does the mind pass on its way from infancy to maturity?

What use should be made of the multitudes of inquiries prosecuted with reference to the minds of animals, in the study of human reason?

The student of anthropology frequently finds himself in sympathy with Wordsworth, singing, —

> "Our birth is but a sleep and a forgetting;
> The soul that rises with us, our life's star,
> Hath had elsewhere its setting,
> And cometh from afar."

If, as Mr. Spencer says, that which we inherit represents the accumulated experiences of a thousand generations, is it also possible to retain the consciousness of those experiences? Will the sensitiveness of consciousness keep pace with the growth of knowledge, and obviate the necessity of laborious records? In which case we should have mental and spiritual atavism explained, and that universal sympathy felt by cultivated people for those standing on the lower steps of civilization.

Now, whatever thoughts any other creature than ourselves may have, and leaving out the possibility of mechanical mind-reading in the future, up to this time the only knowledge men have gained about one another's thoughts has been acquired from expression. The expression of thought is language. Dr. Hoffman finds language in rock paintings and carvings; Col. Mallery, in gestures; Mr. Thomas, in the Maya hieroglyphics; and the glossologists, in human utterance. Happily for us, they are a clever set, and well up in their craft. Let us hear some of the questions they are discussing: —

What are all the devices employed by living creatures to express their thoughts, emotions, and volitions?

Which took precedence in the origin of language, signs, or vocal utterances?

What is the explanation of the origin of language?

What light does language throw upon the origin of species?

Is the evolution of language a safe guide to the knowledge of the unfolding of the human mind?

By what lines have the forms of speech progressed?

How far is similarity of language an evidence of consanguinity among peoples?

Is there a genetic relationship between monosyllabism, polysynthetism, and inflection?

What credit must be given to the ear, and the invention of writing, in the conservation, and lines of progress, of language?

How should languages be classified?

Here we may leave the students of language, and take a new guide. Looking over the earth, we behold men divided into races or consanguineous groups, filled with race prejudices, and restricted by race capabilities.

What are those external and anatomical characteristics which have become transmissible by inheritance? When and how were they fixed? Are we to imagine, with Dr. Kollmann, that certain race forms were fixed far back in the past, just as the chemical elements were made irresolvable by a former state of matter?

Of these heritable marks, which is the best criterion of race, — the skull, the color of the skin, the texture of the hair, language, art, social organization, or mythology? or is it certain fixed correlations of these

and other characteristics? If so, what are the laws of correlation and conservation in the races? Should the same set of structures be depended on in each race? How many races of men are there? and are these species, or varieties?

In what manner should the question of race enter into the administration of politics, economy, education, and colonization?

It is impossible to say when this subject of race first became attractive to human minds. In the oldest histories and on very ancient monuments, are to be seen attempts to classify the families of mankind. In all the encyclopaedias, under the word 'ethnology' will be found the schemes of modern writers. But, since the commencement of our century, the subject has been taken out of the hands of individuals, and has engrossed the attention of societies. Manuals of instruction have guided the voyager and the traveller in recording the characteristics of races. In Stanford's Compendiums, based on von Hellwald, Mr. A. H. Keane has commenced a codification and synonymy of all the tribes of men. This he proposes to follow up with a biographical dictionary of tribes. The Bureau of ethnology has collated the names, priscan homes, migrations, and bibliography of all the North-American Indian tribes. So that we are in a fair way to know something about the races of men, by proceeding from particulars to a general view.

Passing from man to his works, we are face to face with aesthetic and practical art as a unique study. All art relates to human desires for food, clothing, shelter, for activity in peace and war, for beauty, for social and spiritual happiness. Mr. Tylor has taught us to look upon art products as species that have had an evolution, a life history; and this was very much the plan of Gustav Klemm. This sort of study has captivated many anthropologists, and they are asking such questions as these: —

Admitting that the arts have been progressive, what have been the lines of their elaboration?

May we, by a process of elimination, trace backward the life history of each art, as a patent attorney or a chancery lawyer?

At what degree of workmanship may we be sure that flakes of flint, gashed bones, and wrought wood, give evidence of human handicraft?

When does similarity of art-forms indicate social or commercial contact? when, consanguinity? and when, merely the same gradus of culture?

Is degenerate art a facsimile of early, progressive art?

Is it allowable to fill up the gaps in the arts of any tribe by seemingly intermediate forms from other tribes?

Whence is the sense of beauty?

The answers which we unconsciously give to these queries are the major premises of our arguments respecting the history of civilization.

By marriage in some of its forms, human beings are united into consanguineous groups, whose other needs demand and produce other bonds of union, and widen the separation from other groups. With reference to each set of duties in the tribe, unwritten or written codes embody a system of ethics, regulating conduct in every particular. Farther on in their history, groups have relations of war and peace, and the absorption of homogeneous and heterogeneous peoples into a defined area gives rise to nationalities.

Were men ever herded together in promiscuity?

What were the earliest forms of social life?

What were the most primitive forms of marriage in groups?

Have all the tribes of men passed through the same systems of consanguinity and affinity?

Can the highest systems of altruistic ethics be explained by natural processes?

What are the most beneficial relations of labor to natural resources? and how have the present relations been brought about?

What is the history of the control of the body politic over the individual, and of the jurisdiction of corporations? and to what extent may individual freedom be controlled without discouraging private ambition?

What has been the life history of communism, crime, fashion, and politics?

Is it possible to regard and define facts in sociology by the terms of physical science?

Again, these human beings spend a great portion of their time acting and speaking as if other eyes and ears than those of mortals were cognizant of them. In the darkest nights, at the rising sun, throughout the day, at certain seasons of the year, this unseen world is involved. In groves, in caverns, in estufas, or in costly temples, it is all the same: praises, petitions, and offerings confront the inscrutable power that can work men weal or woe.

How did man come to believe in the animation of things, fetiches, the wanderings of ghost-souls, spirits benevolent and malignant, the gods of classic mythology, and the Great Father of all?

What are the first conceptions of children respecting such things? and will these guide us aright to the childhood of faith?

Has the history of mythology run parallel with the history of material and intellectual progress?

How may we divest ourselves of the personal equation, and learn the true psychology of savage worship?

Is Dr. Brinton right in applying the rules of interpretration adopted for Aryan mythology to American Indian myths, and in assuming that their crude stories are disguised deifications of the phenomena and powers of nature?

Finally, as men wander about the earth, and certain families are to be found chiefly in certain localities, so is it with races. Longevity, fecundity, and vigor are influenced by such causes as height above the sea-level, purity of the atmosphere, amount and distribution of heat, moisture, winds, fertility of the soil, and proximities, whether they be vegetal, animal, or human, whether they be beneficial or injurious.

By what subtle chemistries of the things around us, by what exposures in this terrestrial camera, come to pass the various hues of the skin and hair and eyes, the long skull and the short skull, the long face

and the broad face, and the fixed compounds called natural characteristics?

By what processes of selection and adaptation has this cosmopolitan species come to occupy the whole earth, its genial climes, its frozen areas, and its fever-cursed tropics?

Is it possible to control these phenomena, or to adjust the human machine so as to anticipate and assist nature, to expedite natural selection and the survival of the fittest? or even to subdue nature, and decide for her what shall be the fittest to survive?

From this hasty survey of the scope of anthropology, we return to inquire what benefit the world derives from the cultivation of this science.

I answer, firstly, that every study is improved by study. All things become clearer to him who steadily fixes his gaze upon them. The sciences all began with vain speculations, — astronomy with astrology, chemistry with alchemy, geology with cosmogonies, biology with nature-worship, and theology with mythology. Long before the word 'anthropology' was employed in its present acceptation, Alexander Pope wrote, "The proper study of mankind is man." But, millenniums before his day, mankind studied mankind by the light of their time. The study of man is no new thing, therefore. Now, since human thought has run, and will continue to run, in that direction, it becomes our privilege to rejoice that the stream has in these last days run wider and deeper and clearer. The proper study of mankind is the scientific study of man, the multiplication of rigorously exact observations, the collection of thousands of well-authenticated specimens, the classification of both observations and specimens on rational bases, and the limitation of our conclusions to the extension of our premises. Some of my hearers have worked systematically and patiently for years at American archeology, or the anthropology of the modern Indians; and you rejoice with me to-day that our science has at last attained dignity and respect. With profound veneration I mention the names of Hildreth, Atwater, Stephens, Gibbs, Schoolcraft, Morton, Gallatin, Wyman, Squier, and Davis: with what buoyant hope they looked forward to this day, and with what exquisite pleasure must such living witnesses of the beginning as Horatio Hale, Col. Whittlesey, Dr. Jones, and Mr. Hempstead now contemplate the progress of solid work! The Smithsonian institution will have to republish Squier and Davis, with many additions and corrections by Dr. Rau; the Bureau of ethnology will antiquate Schoolcraft and Gallatin and Gibbs; Morton's and Wyman's work will be entirely susperseded by that of the Peabody museum and the Army medical museum. The Archaeological institute of America will throw new light upon the researches of Stephens; and Mr. H. H. Bancroft will make it entirely unnecessary to wade through thousands of pages of ancient Spanish literature. Therefore the first and most beneficial result of modern anthropology has been the direction of an immense amount of rambling and disorganized labor into systematic and rational employment. This clearing of rubbish, correction of misconceptions, cultivation of a modest spirit, willingness to abide the result, multiplication of materials, refinement of instruments, improvement of processes, in a study which thousands are determined to pursue, must strike every thinking person as a wonderful reformation.

Secondly, the value of a study must be estimated by its effects upon human weal. Farmers, miners, fishermen, lumbermen, mechanics, are slow to recognize their debts to the man of science. But who can estimate the millions of dollars saved by such studies as those of Packard, Riley, and Thomas, on the grasshopper, potato-beetle, and army and cotton worms, and the confidence engendered by the belief that a knowledge of the habits of these animals would lead to their conquest? It would take but a few moments to show that this argument applies with manifold force to the study of man himself.

It is not enough for the good physician to know the nature of remedies, or the use of knives and diagnostic apparatus. Sad will be his use of these if he has not familiarized himself with the structure of the human body in health and in disease, and, above all, if he has not made a correct diagnosis of his patient's case. Are not all the questions asked in the first part of this discourse, and many others agitated by anthropologists, connected with human welfare? Do they not relate to the body, mind, and speech of man, to the races of mankind, their arts, amusements, social needs, political organizations, religion, and dispersion over the earth? For instance, the French in Africa, the British in India, and our own citizens in malarious and fever-laden regions, — have they not learned from loss of treasure, ruined health, and the shadow of death, that there is a law of nature which cannot be transgressed with impunity?

It is the same with sociology and religion. The pages of history glow with the narratives of crusades against alleged wrongs, which were in reality campaigns against the sacred laws of nature. Social systems, which had required centuries to crystallize, have been shattered in the effort to bend them to some new order of things. Arts and industries planted in uncongenial soil, at great expense, have brought ruin upon their patrons, who had not studied the intricate laws of environment.

What a modification of temper, for instance, has been wrought among Indo-Germanic peoples by those studies in comparative philology which have led them by the hand back to their priscan home, and demonstrated, that though they may have aggregated into antagonistic nationalities, and fostered inimical industries, the same blood courses through their veins!

The better knowledge of race and race peculiarities has revolutionized and humanized the theories of aborigines. The doctrine of extermination, formerly thought to be the only legitimate result of colonization, has become as odious as it is illogical.

The inductive study of mind has hardly begun; but how much more successfully and rapidly will education and the development of the species progress when the teacher and the legislator can proceed at

once from diagnosis to safe prescription, when natural selection and human legislation shall co-operate in the more speedy survival of the fittest! The time seems to me to have arrived when our great anthropological societies and institutions should institute a systematic, co-operative study of psychology.

In a land where the archeologist may tally off most of his finds by savage implements in use at his very door, it seems like presumption to speak to you of the advantages of the most careful archeological methods. But there is a difference between the old and the new archeology. There are times in the settlement of a new country, when every man is his own carpenter, smith, and physician. But how soon your energies have worked out of that! Now I speak only of professional archeology and its advantages. How many mistakes of his predecessors has Mr. Putnam alone corrected? We have all read with pleasure his recent correction of Dr. Hildreth's mistakes about iron in the mounds. It is so with your archeological collections: only those gathered in a scientific spirit will have any lasting value. But in the accumulation and preservation of such, you are the storers of force of the greatest value. You are recovering the scattered fragments of an ancient mosaic which will one day be reset, and its legend will be the lost history of prehistoric man.

The third benefit to which I will call your attention is the opportunity which the science affords for the exercise of every talent, even the highest. The difficulty of any problem depends upon the number or the degree of its unknown quantities. When facts were few, and the data of the science were beclouded with many sources of error, no wonder that men of logical minds left these investigations to those of a more imaginative disposition. Their crude, preliminary efforts have given place to organized work, directed by men of the greatest executive ability, assisted by skilful specialists, and endowed both by private munificence and by public appropriation. Not to go beyond the limits of our own country, we all point with pride to the Peabody museum, the Archaeological institute of America, the American antiquarian society, the museums of New York city and of Philadelphia, the Smithsonian institution, National museum, Bureau of ethnology, Army medical museum, and the Anthropological society at Washington, the academies of Cincinnati, St. Louis, and Davenport, and the historical societies of many of our states, including the Minnesota collections.

Now, the special merit of such great centralization of resources is that everybody can study something. It is possible for every craft and profession thus to prosecute its researches and to make its contributions. During the past winter, papers were read before the Anthropological society at Washington by comparative anatomists, biologists, archeologists, geologists, physicians, paleographers, sign-linguists, philologists, patent-examiners, artists, statisticians, sociologists, clergymen, metaphysicians, and ethnographers. And this does not exhaust the scheme. Mothers, school-teachers, those in charge of the insane, the criminal, and the defective classes, lawyers, mechanics, musicians, philanthropists, legislators, may all contribute to this science some handiwork which will help to make the pile complete. To be still more personal, permit me to say to each one before me, that there is anthropological work which your peculiar occupation fits you to do better than any one else on earth. For example, a distinguished ornithologist, Mr. Henshaw, has recently identified all the birds in the well-known mound-pipes. An artist, Mr. Holmes, has succeeded in bringing order out of confusion in the shell ornaments of the mounds. A patent-examiner, Mr. Seely, traces backward aboriginal art. A general in the British army, Pitt-Rivers, worked out the history of the elaboration of the implements of war. An educator, Mr. Peckham, has recently given us the result of a laborious investigation on the growth of children. The geologists must interpret for us the significance of our discoveries in the drift. Where can I stop? I will boldly avow that the day of tyros is gone. There is a great multitude of collectors throughout our states who will have to go to school to Professor Putnam, or Dr. Rau, or Dr. Thomas, before they will have the faintest conception of the significance of their treasures.

The inevitable result of special research is generalization. Kepler, Newton, Count Rumford, Kirchhoff, Bunsen, and Darwin, are names that stand for these processes in material science. To Herbert Spencer we are indebted for the first effort in this direction respecting human phenomena, and his work will be revised and corrected by those who will approach the task with better instruments and more reliable material.

In this heaving mass of humanity, returning into itself ever with vast gulf-streams and eddies, each actuated by its special forces, there is, after all, orderly motion. We discover that our little circle is part of a greater circle, and for a moment the mind is satisfied in the contemplation of this wider truth. Recovering, and renewing our investigation, the fact is reached, that this and its congeneric circles are part of a greater movement more complicated and perplexing. By the pursuit of this wider knowledge the intellect is strengthened, and thereby is brought about the natural selection of the mind. While many tire, or are unable to comprehend the situation, others press on, and grow strong by the effort.

The last advantage of which my time will allow me to speak is the assistance which such studies render to philanthropy and legislation.

Standing on the deck of a steamer, and looking at the land left behind, we seem to be but a mile or two away. We are surprised with the information, that what seems so near is many miles distant. It is so with human history. In our childhood we believed that the first man walked the earth only a few centuries ago. All the events known to us then could easily have occurred in that brief period. The increase of knowledge expands the boundaries of time, and the origin of man is now lost in the mists of the past. Could any thing fill our minds with greater love for our race than the magnificent struggle they

have made in these millenniums? At the other end of the journey we were no better than brutes, and now we look out upon the cosmos as something reasonably comprehended.

If 'pity for a horse o'er-driven' fills the heart of the poet, with what tenderness should we look upon the savage races, and remember that the whole family of man has stopped, some time or other, at that wayside inn! Each aberrant form, abnormality, criminal, dwarf, and giant shows the by-paths of human growth into which our life-stuff may have wandered. The arrow is the parent of the cannon-ball; the stone or bone spear-point, of the bayonet; the flint chip, of all edged tools; the cave-man, of the French *savant;* the hut, of the palace; the tattoo, of regalia; the gorget, of the crown jewels; the quipo and pictograph, of the printed book; promiscuous concubinage, of holy wedlock; the hunting-party, of society; the clan, of the state; the fetich, of the pantheon; and universal animism, of universal causation. Instead of our ancestral belief in a tree with roots in the earth and branches in heaven, our tree has its roots in the past, and is ever putting forth leaves and flowers in a brighter present.

All sciences are retrospective. The astronomer, the physicist, the biologist, find the bases of their prophecies in the past history of the universe. The statesman, if he be wise, will imitate their example, and feel secure of his legislation for the future only so far as it is founded upon an intimate knowledge of the past.

The value of this study to philanthropy is easily shown. With what admiration do we read of the devotion of those missionaries who have suffered the loss of all things in their propagandist zeal! Science has her missionaries as well as religion, and the scientific study of peoples has notably modified the methods of the Christian missionary. The conviction that savage races are in possession of our family records, that they are our elder kindred, wrinkled and weather-beaten mayhap, but yet worthy of our highest respect, has revolutionized men's thoughts and feelings respecting them. The Bureau of ethnology has its missionaries among many of the tribes in our domain, no longer bent on their destruction, but treating them with the greatest consideration, in order to win their confidence, to get down to their level, to think their thoughts, to charm from them the sibylline secrets. It sounds something like the old Jesuit relations, to hear of Mr. Cushing at Zuñi, eating vile food, wearing savage costume, worshipping nature-gods, subjecting himself to long fastings and vigils, committing to memory dreary rituals, standing between disarmed Indians and their white enemies on every hand, in order to save their contributions to the early history of mankind. You will recall the fact, that an honorable senator more than a year ago offered, as an argument against sudden disruption of tribal affinities, an elaborate scheme of the Wyandotte confederacy. Max Müller says, "He who knows little of those who preceded him is likely to care little for those that come after. Life would be to him a chain of sand, while it ought to be a kind of electric chain that makes our hearts vibrate with the most ancient thoughts of the past as well as the most distant hope of the future."

In the study of this anthropo-cosmos, as in other studies, we are brought face to face with the inscrutable. In these voyages of discovery we have no right to expect that we shall ever find a passage to the ultimate truth. As with the child, so with the man; as with the individual, so with the race; as in the past, so in the present and the future, — the solution of one problem only prepares the way for many far more complicated. With all our sciences comes the consciousness of new ignorances. There is more known to be unknown now than when wise men knew that they did not understand many things well known to us. So will it ever be. Just about one hundred years ago, Peter Camper's measurements of the facial angle, with a few observations on height and weight, were thought to be all that anthropometry could furnish to the natural history of man. In 1881 Paul Broca laid down for the skull and the encephalon more than one hundred and fifty measurements; and the Germans go beyond that. Think you, the weighing and measuring will stop at these? We are just on the threshold of applying experienced training and instruments of precision to the study of man. Examine, if you please, the circulars for information issued by the old Paris ethnological society, Albert Gallatin, Lepsius, Max Müller, and the Smithsonian institution, with those published for the Novara expedition, by the British association, Kaltbrünner, Roberts, the new Paris society, or Major Powell, and you will have ocular evidence of the advance of anthropology.

But there is no Ultima Thule in science. No question propounded to nature will ever be answered. I can imagine the night of despair that would settle around any one of my hearers when he had reached the consciousness of having gathered the whole harvest of truth. On the other hand, I am sorry to hear any of our great thinkers uttering the words *ignoramus et ignorabimus* as a wail of despair. They should be to all the sweet voice of hope. They do not mean that we know nothing, or that we shall ever remain totally ignorant. Fresh, vigorous, buoyant, science feels itself to be on a pleasant journey, whose destination may remain unknown, but every mile of whose progress unfolds new vistas of beauty and variety in nature, each transcending the other.

I congratulate you, dear friends, that the American association has delegated to you such an important trust. The illustrious names to be found among our members and fellows are a sufficient guaranty that you have lighted your torches, and that our science will not be a laggard in this grand march. Professor Henry said, in 1859, "The statement cannot be too often repeated, that each branch of knowledge is connected with every other, and that no light can be gained in regard to one which is not reflected upon all" (Smith. rep., 1859, p. 15). We may go farther, and say, that, whenever any marked generalization is made in any science, all other sciences proceed at once to put themselves in line with the new order. It is the duty of the anthropologists, therefore, not

only to rejoice in the growing light of chemistry and biology, but, quickened by their warmth, to put forth new life and vigor, and to apply to their investigations the most refined instrumentalities and the most subtle thought; believing with Lord Lytton that man is a subject of far nobler contemplation, of far more glowing hope, of a far purer and loftier vein of sentiment, than all the 'floods and fells' in the universe.

PAPERS READ BEFORE SECTION H.

(*MOUNDS AND MOUND-BUILDERS.*)

The great mounds of Cahokia.

BY WILLIAM McADAMS OF ALTON, ILL.

THE mounds referred to are in the locality known as the 'American bottom.' The region so called is a strip of alluvial land in the state of Illinois, lying between the bluff and the Mississippi river, and extending from the city of Alton to a point below the city of East St. Louis. A map of the locality, showing the places and dimensions of the mounds, was exhibited before the section. The mounds are over two hundred in number, and are the largest in the United States. A group of seventy-two mounds on the Cahokia creek was specially considered. The central mound of the group is the largest: it is a hundred feet high, and covers fourteen acres of ground. It is a truncated pyramid with two terraces: its flat top has an area of one and a half acres. The surrounding mounds are thirty to forty feet high: they are square, in this respect differing from the conical mounds of Ohio. The mounds on the bluff seem to be of a different order, being only four or five feet high, and round or oval. Unquestionably the mounds of the Cahokia valley are artificial, being made of black alluvial earth, entirely different from the ground on which they rest.

The author accounted for the fact that there were few mounds on the banks of the Mississippi river, by supposing that the mound-builders were afraid of their enemies beyond the stream.

Numbers of relics have been found in the Cahokia mounds, mostly of flint, some of them eighteen inches long. The finest is a white flint axe, which is of a smoothness and polish like ivory. In reply to an inquiry, the author stated that there had been considerable alluvial deposit formed since the mounds were built. The subsoil is a yellow clay loam: under the mounds is a floor of white sand.

In discussing the paper, Gov. Bross stated that he had discovered, on the top of the only round mound of the group, a large flat stone, which he thought might have been used for sacrificial purposes. A skeleton had been found, of a man more than six feet high: the whole series of mounds gave evidence of the energy and industry the men of that time had possessed. Dr. Hoy said that there was in Africa a mere bird that threw up a mound fifteen feet high, so that these men might not have been even large. Mr. Putnam expressed the opinion that the mounds were simply a site for a town, and not a worshipping-place. Mr. McAdams said he had been led to believe they were places of worship, by the use of just such mounds for places of worship in Mexico, their sun-worship being their government. There are few, if any, evidences of habitation.

Metrical standard of the mound-builders, by the method of even divisors.

BY CHARLES WHITTLESEY OF CLEVELAND, O.

IN the absence of the author, an abstract of the paper was read by the secretary of the section. An endeavor was made, by the method named, to ascertain the standard of linear measurement which was used by the mound-builders. It is supposed that they, in common with other early races, used the length of some part of the human body as a linear unit. Several theories of the kind were tested mathematically, but, thus far, with only negative results.

The mound-builders identified.

BY JOHN CAMPBELL OF MONTREAL, CAN.

THIS paper was read by the secretary of the section, in the absence of the author.

It was a pains-taking attempt to trace the origin of the mound-builders in the eastern hemisphere, chiefly by means of a comparison of ancient languages along the line of a supposed route. The line of similarity was believed to indicate that the original people were Khitan or Khitos, Kathaei, Katei, Khilon, or Citem; and that they had made their way across Europe and northern Asia to Alaska, and thence to the United States, down the Mississippi valley, to Mexico.

Professor Mason, the president of the section, expressed the opinion that Professor Campbell was on the wrong track, while complimenting him upon his exceeding zeal and patience in his research. Professor Mason consoled himself, however, with the thought that the author had so thoroughly exhausted the subject that no one would ever attempt a similar experiment. Mr. D. A. Robertson of St. Paul differed from the president, and expressed the opinion that Professor Campbell was on the right track, and that the migration of the mound-builders would be traced from Siberia, or by the European isles, and, if not in one migration, in several.

Typical shapes among the emblematic mounds.

BY S. D. PEET OF CLINTON, WIS.

BY means of diagrams, the author exhibited the ground-outlines of different mounds which he had surveyed in Wisconsin, which showed that they had been made in the form of animals, in different postures. There were flying geese, eagles, jack-rabbits, panthers in the act of jumping upon their prey. Many of the supposed effigies were of great size, the tail of one squirrel having a length of three hundred feet. One of the mounds was in the shape of an elephant, with a very pronounced trunk. This mound, however, is now destroyed; and the