# TRANSACTIONS

OF THE

# ANTHROPOLOGICAL SOCIETY

# OF WASHINGTON.

---

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Communications for the Society should be addressed to Col. F. A. SEELY, U. S. Patent Office.

Exchanges and specimens should be sent to Dr. W. J. HOFFMAN, Bureau of Ethnology.

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FOR THE YEAR 1885.

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# CONSTITUTION.

ARTICLE I.—*Name.*

The name of this Society shall be "THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON."

ARTICLE II.—*Object.*

The object of this Society shall be to encourage the study of the Natural History of Man, especially with reference to America, and shall include Somatology, Sociology, Philology, Philosophy, Psychology, and Technology.

ARTICLE III.—*Members.*

The members of this Society shall be persons who are interested in Anthropology, and shall be divided into three classes: Active, Corresponding, and Honorary. The active members shall be those who reside in Washington, or in its vicinity, and who shall pay the dues required by Article XV. Failure to comply with this provision within two months after due notice of election, unless satisfactorily explained to the Council, shall render the election void. Corresponding members shall be those who are engaged in anthropological investigations in other localities; honorary members shall be those who have contributed by authorship or patronage to the Advancement of Anthropology. Corresponding or honorary members may become active members by paying the fee required by Article XV. Any corresponding member from whom no scientific contribution is received for two years after his election may be dropped from the list of members by a vote of the Council, but when so dropped shall be eligible to reinstatement.

All members shall be elected by the Council and by ballot, as follows: The name of the candidate shall be recommended to the Council, in writing, by two members of the Society, and eight affirmative ballots shall be necessary to an election.

No person shall be entitled to the privileges of active membership before paying the admission fee provided in Article XV.

ARTICLE IV.—*Officers.*

The officers of this Society shall be a President, four Vice-Presidents, a General Secretary, a Secretary to the Council, a Treasurer, and a Curator, all of whom, together with six other active members, shall constitute a Council, all to be elected by ballot at each annual meeting. The officers shall serve one year, or until their successors are elected.

ARTICLE V.—*The Council.*

All business of the Society, except the election of officers at the annual meeting, shall be transacted by the Council, five members of which shall constitute a quorum.

The Council shall meet one half-hour before the regular sessions of the Society, and at such other times as they may be called together by the President. They may call special meetings of the Society.

ARTICLE VI.—*The Sections.*

For active operations the Society shall be divided into four sections, as follows: Section A, Somatology; Section B, Sociology; Section C, Philology, Philosophy, and Psychology; Section D, Technology. The Vice-Presidents of the Society shall be *ex-officio* chairmen of these sections respectively, and shall be designated by the President to their sections after their election. It shall be the duty of these sections to keep the Society informed upon the progress of research in their respective fields, to make special investigations when requested by the Council, to announce interesting discoveries, to collect specimens, manuscripts, publications, newspaper clippings, etc., and in every way to foster their divisions of the work.

All papers presented to the sections shall be referred to the Council, and through it to the Society.

ARTICLE VII.—*The President.*

The President, or, in his absence, one of the Vice-Presidents, shall preside over the meetings of the Society and of the Council, and shall appoint all committees in the Council and in the Society.

At the first meeting in February the retiring President shall deliver an address to the Society.

ARTICLE VIII.—*The Vice-Presidents.*

The Vice-Presidents shall respectively preside over the sections to which they have been designated, and represent such sections in the Council and in the Society.

Each of the Vice-Presidents shall deliver an address during the year upon such subject within his department as he may select.

ARTICLE IX.—*The General Secretary.*

It shall be the duty of the General Secretary to record the transactions and conduct the general correspondence of the Society.

ARTICLE X.—*The Secretary to the Council.*

The Secretary to the Council shall keep the minutes of the Council, shall keep a list of active, corresponding, and honorary members, with their residences, shall notify members of the time and place of all meetings of the Society, and shall perform such other duties as the Council may direct.

ARTICLE XI.—*The Treasurer.*

The Treasurer shall receive and have charge of all moneys; he shall deposit the funds as directed by the Council, and shall not expend any money except as ordered by the Council. He shall notify members in writing when their dues have remained unpaid for six months.

ARTICLE XII.—*The Curator.*

The Curator shall receive, acknowledge, and have charge of all books, pamphlets, photographs, clippings, and other anthropological material, and shall dispose of them in accordance with Article XVI, keeping a record of them in a book provided by the Society.

ARTICLE XIII.—*Meetings.*

The regular meetings of the Society shall be held on the first and the third Tuesday of each month from November to May, inclusive. An annual meeting for the election of officers shall be held on the third Tuesday of January in each year, a quorum to consist of twenty active members who are not in arrears for dues; and visitors shall not be admitted. The Proceedings of the Society shall be conducted in accordance with the established rules of parliamentary

practice. Papers read shall be limited to twenty minutes, after which the subject shall be thrown open for discussion, remarks thereon to be limited to five minutes for each speaker.

### ARTICLE XIV.—*Publications.*

The address of the President, provided in Article VII, and the transactions of the Society, shall be printed and published annually or at such periods and in such form as may be determined by the Council.

### ARTICLE XV.—*Fees and Dues.*

The admission fee shall be five dollars, which shall exempt the member from the payment of dues during the year in which he is elected. The annual dues thereafter shall be three dollars, to be paid prior to the election in January. The names of members failing to pay their dues one month after written notice from the Treasurer, as provided in Article XI, shall be dropped from the roll, unless from absence of the member from Washington or other satisfactory explanation, the Council shall otherwise determine.

### ARTICLE XVI.—*Gifts.*

It shall be the duty of all members to seek to increase and perfect the materials of anthropological study in the national collections at Washington. All gifts of specimens, books, pamphlets, maps, photographs, and newspaper clippings shall be received by the Curator, who shall exhibit them before the Society at the next regular meeting after their reception, and shall make such abstract or entry concerning them, in a book provided by the Society, as will secure their value as materials of research; after which all archæological and ethnological materials shall be deposited in the National Museum, in the name of the donor and of the Society; all crania and somatic specimens, in the Army Medical Museum; all books, pamphlets, photographs, clippings, and abstracts, in the archives of the Society.

### ARTICLE XVII.—*Amendments.*

This constitution shall not be amended except by a three-fourths vote of the active members present at the annual meeting for the election of officers, and after notice of the proposed change shall

have been given in writing at a regular meeting of the Society, at least one month previously.

ARTICLE XVIII.—*Order of Business.*

The order of business at each regular meeting shall be:

1. Reading the minutes of the last meeting.
2. Report of the Council upon membership.
3. Report of the Curator.
4. Reading the papers and discussions.
5. Notes and queries.

# LIST OF SOCIETIES

IN CORRESPONDENCE WITH THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

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# LIST OF PAPERS READ.

# TRANSACTIONS.

SEVENTY-SECOND REGULAR MEETING, November 6, 1883.

Colonel GARRICK MALLERY, President, in the Chair.

The SECRETARY reported for the Curator the receipt of fifty-three gifts of publications since the last meeting in May.

On motion of Col. SEELY, the Society passed a vote of thanks to the gentlemen who had donated the publications above referred to.

The retiring President, Major J. W. POWELL, then read his address entitled "HUMAN EVOLUTION."*

SEVENTY-THIRD REGULAR MEETING, November 20, 1883.

Colonel GARRICK MALLERY, President, in the Chair.

The election of Dr. Charles Warren, of the Bureau of Education, and Mr. S. H. Kauffman, as active members, was announced.

In the absence of Mr. L. A. Kengla, his paper, entitled "STONE MOUNDS AND GRAVES IN HAMPSHIRE COUNTY, WEST VIRGINIA,"† was read by Prof. O. T. MASON.

ABSTRACT.

The mounds or graves described in this paper are found on the eastern side of the South Branch Mountain, Hampshire Co., W. Va., about one mile and a half from the mouth of the South Branch, on the property of Charles French. This entire region was once held by the Massawomec Indians, and the locality under consideration was the hunting ground of the Tamenents.

* Published in Vol. II, Transactions Anthropological Society, Washington, pp. 176–208.

† Published in the Annual Report of the Smithsonian Institution for 1883, pp. 868–872.

The graves or mounds were of a very peculiar construction reminding one of the stone graves of Tennessee and yet possessing some specific characteristics. The most noticeable feature is the presence of a rude stone cist completely covered with a huge pile of loose stones. In some cases these piles were of great extent.

DISCUSSION.

Major POWELL said that as many were not personally familiar with the stone graves and mounds of the upper Mississippi and its many great tributaries, he would remark that these forms of receptacles for the dead consisted of stones placed edgewise so as to form an oblong space, the stones presenting an almost continuous shoulder, upon which was placed a stone slab as a cover.

The discovery of articles of modern manufacture was not of rare occurrence, and the recent investigation by Mr. Carr, of the Peabody Museum at Cambridge, and the researches of the Bureau of Ethnology combined to show that the "Mound-Builders" could not be classed as a people distinct from the historic Indians occupying those localities where such remains are still found.

Prof. MASON stated that the paper just read was useful for the reason that the subject pertained to a region comparatively near to our city, which had not yet been investigated. Several years ago, a party consisting of Dr. Rau, Mr. Reynolds, and other gentlemen visited the Luray Cave for the purpose of investigation, and Mr. Reynolds subsequently opened some stone graves near that locality. These were really cairns.

Major POWELL said that in Kentucky and elsewhere stone graves are found by the hundred. He had opened great numbers of graves in the same mound, showing that people had buried bodies in diverse ways and at different times, the manner being that stone grave was added to stone grave until scores were erected.

Prof. MASON inquired whether single stone graves had been discovered over which large heaps of stones had been erected, to which Major POWELL replied that he had not, to his recollection, found single graves so covered, but where there were several together, many of the western tribes are said to cast stones upon the graves of their dead; but more definite information as to their actual practice was desirable.

Prof. GORE said that during a recent visit to southwestern Vir-

ginia he learned of quite a number of mounds, none of which had yet been opened, and suggesting that this would present a good field for future investigators. The large number of stones referred to in the paper seemed a curious coincidence with a discovery made in New Mexico, consisting of a large stone erected near one of the pueblos about which lie several wagon loads of stones, thrown there, it is said, by passers by for "good luck."

Dr. REYNOLDS presented some facts referring to his examinations in various portions of the Potomac valley, and concluded by saying that at the site of an "ancient" burial ground at Front Royal, which had been partly washed down by high water at various times, he had found, among other things, medals, &c., of perhaps colonial times.

Major POWELL said that while in Minnesota last summer he inquired of a Sioux Indian their reason why they buried upon scaffolds, and was informed that in ancient times the Sioux lived among the lakes of Minnesota, and buried their dead in mounds; that when they left that country they expected some time to return, and so buried their dead on scaffolds, that they might gather the bones and bring them back and bury them in the grave mounds of their ancesters.

Prof. MASON stated in conclusion that many stone graves have been found in localities which do not abound in stones, plainly indicating that a strong motive caused them to be brought from great distances. Probably the people had originally lived in a stony country, and in new fields had clung to old usages.

Rev. J. OWEN DORSEY then read a paper entitled "AN OSAGE SECRET SOCIETY," which was further illustrated by a chart, enlarged from an original pictographic representation obtained from an Osage Indian.

ABSTRACT.

The writer has found traces of secret societies among the Omahas and cognate tribes of the Siouan family. Such a society is still in existence among the Osages. It must not be confounded with the secret societies of the Indian doctors. Each gens in the Osage tribe has a place in the order, the latter being the depository of the

mythical accounts of the origin of the gentes. It takes four days to relate the tradition of any gens, making eighty-four days needed to hear all the traditions. The order consists of seven degrees: 1. Songs of the Giving of Life. 2. Songs of the Bird (dove). 3. Songs of the Sacred Thing (bag). 4. Songs of the Pack-strap. 5. Songs of the Round Rush. 6. Songs of Fasting. 7. Songs of the Return from the Fight. Women are admitted to the order; but none of the younger people are initiated. Extracts were made from the two versions of the tradition of the Tsi-shu wa-shta-ke or peace-making gens of the left side of the tribe. This tradition is entitled "What is told of the old time (U-nu$^{N}$ U-dha-ke)."

DISCUSSION.

Major POWELL thought it probable that this society might be for the preparation of medicine, or for some mystic rite other than the perpetuation of mythic history.

Mr. DORSEY replied that there are other societies than the above mentioned, entirely distinct, and solely for the preparation of medicine, as he had been able to ascertain. From this society emanate the directions to heads of war parties, plans for erecting lodges, hanging the kettles, and laying the pieces of fire-wood; also to the makers of the war drum, the stand, moccasins, and war bows, certain individuals being selected for each of these duties. Women belong to this society, and these have two small circles tattooed upon the forehead, one above the other. The crease or parting of the hair is painted to represent the path of the sun. In prayer they face the east at sunrise, and the west at sunset. The doors of the lodges are placed at the eastern side, and the dead are buried with their heads toward the east; hence no one will ever sleep with his head pointing in that direction.

Major POWELL then stated that he had, during last winter, investigated the organization of medicine societies among the Muskoki. According to this tribe diseases are caused by mythical animals, such as the bear, elk, deer, owl, spider, &c., and for each disease there is a distinct medicine society, the head personage of which initiates each year young men to cure the various forms of disease belonging to his class. The traditions of the mythical origin of each disease is preserved by the different chiefs of the medicine societies.

The neophyte is instructed through four different nights, through

four different moons, and through four years to instruct him in the mythologic cause of disease.

There are certain medicines employed for the various complaints, composed in part of root decoctions. They are prepared by taking one root running from the trunk directly to the north, one to the east, one to the south, and one to the west. The preparation of the medicine require ceremonies which last during four nights each, of four moons, and of four years each.

Mr. DORSEY stated that part of the Osage ceremonies were strictly secret, though the latter portion was public.

Prof. MASON inquired whether these ceremonies had in any way been influenced by contact with the whites, or whether they were a crystallized custom.

Mr. DORSEY replied that he had found recurrences of these customs in other cognate tribes, and believed that this special ceremony was original.

Prof. MASON desired to know of Mr. Dorsey whether it was not unusual to admit him to the secret meetings, to which the latter replied that it was only after the Indians had discovered that he was familiar with the ceremonies, learned of the northern tribes, that they imparted to him the fact. The speaker further stated that the recitations are also in an archaic form of the language.

In general, all the points obtained from the Osages tally with the information obtained from other cognate tribes.

Major POWELL said that people on reservations may be classed in two divisions, those who are yet pagan and those who profess the Christian religion, but the latter take part in ancient religious rites.

The people of Jemez, although Catholics, still visit the mountains once a month to perform their mystic rites. Some of the Iroquois also adhere to their ancient mystic ceremonies and practise them at stated times.

The importance of a knowledge of Indian languages is illustrated by Mr. Dorsey's paper for the collection of myths and facts pertaining to secret ceremonies, as is also the knowledge of similar customs among other tribes so as to know the method of approach and extraction.

Mr. DORSEY replied that he usually gained the confidence of his hearers by first telling them the myths of other tribes.

SEVENTY-FOURTH REGULAR MEETING, December 4, 1883.

Col. GARRICK MALLERY, President, in the Chair.

The Council, through its Secretary, reported the election of Mr. Amos W. Hart and Dr. Horatio R. Bigelow as active members.

A letter was read from Mr. Gatschet giving information with respect to investigations in the folk-lore of the southern Sclavic peoples by Mr. Krause, one of the corresponding members of the Society.

The death of Sven Nilsson, of Lund, Sweden, an honorary member of the Society, was announced, whereupon the Secretary made brief reference to the labors of the deceased.

Mr. WILLIAM H. HOLMES then read a paper on "THE TEXTILE FABRICS OF THE MOUND-BUILDERS."*

ABSTRACT.

It was stated that very few specimens of these fabrics are preserved in our museums. They are subject to rapid decay and as a rule fall to pieces on exposure to the air.

Carbonization and contact with the salts of copper have been the most important means of perservation.

It has occasionally been noticed that fabrics of various kinds have been used in the manufacture of pottery and that impressions of these have often been preserved.

The writer conceived the idea of making casts in clay of these impressions and by this means restored many varieties of cloth heretofore unknown.

The restoration is so complete that the whole fabric can, in many cases, be analyzed.

It has been made of twisted cord and is seldom finer in texture than common coffee sacking.

The fibre used has probably been obtained from bark, weeds, and grasses.

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*Published in the Third Annual Report of the Bureau of Ethnology with title "Prehistoric Textile Fabrics of the United States derived from impressions in Pottery."

The meshes are usually quite open, knotting and other methods of *fixing* the threads and spaces having been resorted to.

The combinations of threads are much varied and are of such a character as to make it quite certain that the weaving was done by hand, the threads of the web and woof being attached to or wound about pins fixed in a frame or upon the ground.

Specimens of the pottery and casts therefrom were shown and black board analyses of the fabrics were given.

DISCUSSION.

Prof. MASON inquired of Mr. Holmes whether he gave technical names to the various forms, to which Mr. Holmes replied that he found that impossible.

Major POWELL said the paper that had just been read by Mr. Holmes is of exceeding interest to all students of North American archæology; first, from the fact that his methods of research are unique; and, second, that the results of his investigations throw much light upon the status of culture reached by the people who constructed the mounds and other burial places found so widely distributed thoughout the eastern portion of the United States. The research sheds light both upon the textile and ceramic arts of these people, and in both departments they are shown to have been in no respect superior to the Indian tribes first discovered on the advent of the white man to this continent.

It is interesting to notice, in this connection, that the early publications in relation to the mounds and mound-builders of the valley of the Mississippi represent these people as having passed into a much higher culture than the North American Indians at large, and much has been written concerning a civilized people inhabiting this country anterior to its occupation by the Indians. In the light of the research which has been prosecuted during the past years in various quarters and by various persons, the manufactured evidence of the existence of such a people is rapidly vanishing, and this from many points of study. It is shown by a careful examination of the early travels in this country, and accounts of missionaries and various historic records, that some of the early tribes discovered were themselves mound-builders. This is clearly shown in the late publication of Mr. Lucien Carr, Peabody Museum, and by the researches of Professor Thomas, of the Bureau of Ethnology. The

researches of the Bureau of Ethnology also show that many of these mounds were constructed after the arrival of the white man on this continent, as works of art in iron, silver, rolled copper, &c., are found. Glass beads are also found, and many other articles manifestly manufactured during the last few centuries, these usually being such articles as are exchanged by traders to the Indians for their peltries.

Mr. HENSHAW, also of the Bureau of Ethnology, has made an interesting investigation of a subject which throws light upon this question. The early writers claimed that the stone carvings found in the mounds were often representations of birds, mammals, and other animals not now existing in the regions where these mounds were found, and that the mound-builders were thus shown to be familiar with the fauna of a tropical country. And they have even gone so far as to claim that they were familiar with the fauna of Asia, as it has been claimed that elephant carvings have been found. Now these carvings have all been carefully studied by Mr. Henshaw, and he discovers that it is only by the wildest imagination that they can be supposed to represent extra-limital animals; that, in fact, they are all rude carvings of birds, such as eagles and hawks, or of mammals, such as beavers and otters; and he has made new drawings of these various carvings, and will, in a publication which has gone to press, present them, together with the drawings originally published; and he makes a thorough discussion of the subject, being qualified thereto from the fact that he is himself a trained naturalist, familiar with these various forms by many years of field study.

It will thus be seen that many lines of research are converging in the conclusion that the mound-builders of this country were, at least to a large extent, the Indian tribes found inhabiting this country on the advent of the white man, and that in none of the mounds do we discover works of art in any way superior to those of the North American Indians.

I congratulate Mr. Holmes upon the skill with which he has prosecuted this work, and thank him for the clear exposition which he has given us this evening.

Prof. MASON stated that from the organization of the Society he had been more and more confirmed in the idea that the only way in which the truths of anthropology could be brought out was by specialists, artists, physicians, patent examiners, etc. The paper just read is an excellent illustration of this opinion.

Col. SEELY expressed his interest in the illustrations given by Mr. Holmes of research into the state of an art of which none of the products exist. Though absolutely extinct their vestiges remain in other arts; and to those able to read the record written in these vestiges they reveal facts as interesting as they are well ascertained. It takes the trained eye and skillful hand of an artist, supplemented by technical knowledge, to unravel these records. Without intimate acquaintance with the textile art and the structure of different fabrics, the impressions found by Mr. Holmes were hopelessly illegible. This indicates the true method of research into primitive arts, and there should be more of it.

Mr. JAMES A. BLODGETT, Special Agent of the U. S. Census, read a paper on "THE CENSUS OF BENGAL."

ABSTRACT.

The first attempt at a general census of British India was in 1871–2 and showed the population to be about 238,000,000.

The report for the census of Bengal in 1881 has been lately received in this country. It includes the northeast part of India north of the 20th parallel of latitude and west nearly to Benares. Here in an area of less than 200,000 square miles, a little above the joint area of Ohio, Indiana, Illinois, and Iowa, is concentrated a population of some 70,000,000 or two-fifths greater than that of the whole United States.

The authorities took no account of resources or of any but personal items. The preliminary arrangements were so completely adjusted as to take on a single night not only the fixed population but generally all travelers and all vagrants.

Almost two-thirds of the people are Hindoos, nearly one-third Mohammedans, about 158,000 Buddhists, and 128,000 Christians. The enumerated members of the Brahmo Somaj, the reform sect represented by the learned Hindoo who spoke in Washington a few weeks ago, were under 1,000, chiefly in the city of Calcutta.

Child marrriages prevail to a considerable extent, the ceremony in a considerable per cent. of cases occurring before the tenth year of age. Although the parties may not at once live together, the death of one after the ceremony leaves the other legally widowed. Hindoo widowers marry again, but Hindoo widows do not. The ratio of child marriage is lowest among the Buddhists.

There are 65 castes reported of 100,000 or more each, and 265 lesser castes or tribes. Hindooism gradually absorbs the aboriginal tribes, and occupations mark castes something like guilds in western countries, so that caste mingles questions of religion, race, and occupation.

About twenty languages are spoken. Over half the people speak Bengali as their mother tongue, over one-third speak Hindoostani, and only about 36,000 speak English as their mother tongue.

Education is low. The Hindoos are best educated of the great classes. In Calcutta the education of boys compares favorably with that in some western cities. The education of girls is scarcely secured at all, except among the Christians.

Admirable maps and diagrams aid the presentation of the facts in the census.

The digest of the census of Bombay has also been received here without the fullness of discussion or the maps of the Bengal report. The general relations of population and of customs are much the same as in Bengal. A new series of languages occurs, however, and 830 castes are reported, some of which are essentially identical with some of the Bengal castes, but many castes are intensely local in India.

The reports do not follow a uniform spelling in anglicizing even so common words as Hindustani, Mahomedan, and Brahman.

## DISCUSSION.

Major POWELL said: I have been much interested in the paper read by our fellow-member, Mr. Blodgett, as a simple and lucid presentation of the more important facts presented in the Bengal census. One line of facts is of especial interest to me—namely, that relating to the census of the castes of Bengal.

Two great plans for the organization of mankind into states, as tribes and nations, are known: Tribal states are organized on the basis of kinship; national states, on the basis of property, which in its last form appears as territorial organization. Yet from time to time there spring up incipient methods of organization of another class. Men are interrelated in respect to their wants, and ultimately organized thereby through the organization of industries or callings—that is, organized on an operative basis through the division of labor. This method of organization appears in many ways, and in one form

its ultimate outgrowth results in the organization of aristocracies in various grades, with subordinate classes, as serfs and slaves. Again it appears in the organization of guilds. This form of organization was well represented not many generations ago in England, and relics of it still exist among the English people. It appears again in another form in India by the differentiation of people into castes, each caste having a distinct calling or group of callings.

In my studies of sociology it has often been a matter of surprise to me that the state has not oftener and to a larger extent been based upon an organization dependent upon callings, trades, or occupations—that is, that the state has not oftener been organized upon an operative or industrial basis. But when we accumulate the facts of history relating to castes, classes, guilds, &c., it appears that the method has been tried in many ways and it has never succeeded in securing justice to that extent as to commend its adoption.

A caste may be briefly described as a body of men constituting a unit or integral part in the state, and such a body of men are organized upon the basis of the industries or callings which they pursue. Around this organization are centered many other institutional characteristics. Marriage within the group is prescribed, marriage without the group prohibited; and many religious sanctions grow up around these institutions, and many social barriers to prevent escape from the body and entrance into another.

Much has been written about these castes of India, sometimes from the standpoint of religion, sometimes from the standpoint of conquest, and sometimes from the standpoint of McClennan, erroneous theories relating to exogamy and endogamy, names which he gave to correlative parts of the marriage institution found among most of the tribes of the world who are organized upon a kinship basis. It is true that the institution of caste exhibited in India may be profitably studied from each of these standpoints, but the essential characteristic of caste organization is this: That the people are thereby organized upon an operative basis, about which religious and social sanctions are gradually accumulated; that such an organization is in part the result of internal agencies arising from the differentiation of industries, or division of labor, as it is called in political economy, and in part by conquest, as the conquerors usually engage in those vocations deemed most honorable, and compel the conquered to engage in those considered least honorable. By such methods, *i. e.*, the division of labor through the inherit-

ance of callings from family to family, and through the further division, through the selection of callings of conquerors and the imposition of others upon the conquered, castes are primarily established. In the process of this establishment, and subsequently, moral and social sanctions gather about these institutions, and castes are firmly established only to be overthrown by great social convulsions, or, and chiefly, by the march of civilization and the concomitant establishment of justice and those institutions designed to secure justice.

All light thrown upon the institution of caste in India must be welcomed by every scientific student of sociology, and this census of Bengal, as set forth by Mr. Blodgett, is a valuable contribution to this subject.

Dr. JOHNSON inquired as to the effects of these early marriages upon the offspring; whether the children were well developed or deformed; the effects upon health of the crowding of many individuals; whether syphilis prevailed and its general effects.

Mr. BLODGETT replied that the census officials were extremely careful not to push questions that might stir into opposition the prejudices of the people. Great difficulty arose as to the question of early cohabitation from the delicacy of the question and the great variance of English and other European customs; but as the legal ceremony took place at betrothal, betrothal became the point at which to count marriage.

Cohabitation was probably at an earlier average than among western nations, but statistics do not, in this census, help us beyond the general knowledge obtained by observant individuals.

There seems to be a high vitality up to advanced maturity; but after, say, forty-five years of age, the vitality seems to be in favor of the European.

No statistics are recorded on syphilis. The vital statistics have considerable value, however, indicating the predominance of pestilential diseases in districts badly drained, overcrowded, or with other adverse sanitary conditions, and special inquiry was made as to leprosy.

As to guilds and castes, a trace of such tendency may be seen in the perpetuation as a civil corporation in the city of London of more than one society originally founded on the occupation of its members, and now retaining privileges then granted, although no

longer constituted of persons following the employment for which they were founded.

Dr. FLETCHER said he inferred from Mr. Blodgett's remarks that cohabitation does not follow betrothal, and added that it is considered a disgrace if a child is not betrothed when she arrives at menstruation.

Prof. MASON referred to similar kinds of legislation in this country, prohibiting marriage, especially the laws, in many states, against miscegenation. He also said that caste originated at a time when the conquering Aryans were in a great minority, and to preserve the purity of their stock they made stringent laws against intermarriages. The laws of Menu prohibit intermarriages.

The PRESIDENT informed the members that the 2d volume of the Transactions was now ready for distribution, and copies could be obtained by calling upon the Secretary, at the May Building, 7th and E streets N. W.

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SEVENTY-FIFTH REGULAR MEETING, December 19, 1883.

President Col. GARRICK MALLERY in the Chair.

The Council reported, through its Secretary, the election of Mr. Perry B. Pierce, of the U. S. Patent Office, as an active member.

The Secretary of the Council read a letter from Mr. Wilson, U. S. Consul at Nantes, France, relating to his antiquarian researches in that country.

Prof. CYRUS THOMAS then read a paper entitled "THE HOUSES OF THE MOUND-BUILDERS,"* illustrated by diagrams and specimens of clay plastering.

ABSTRACT.

Prof. THOMAS commenced by saying that while the ruins in Central America furnished abundant materials for judging the architectural skill of the ancient people of that region, no such opportunity was offered in regard to the mound-builders, all their buildings having crumbled to dust. Still we are not left wholly in the dark in regard to them. He then went on to show that they must have

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*Published in Magazine of Am. History, 1884, 110–116.

been of perishable materials, and that the little circular depressions from fifteen to fifty feet in diameter surrounded by earthen rings are the sites of ancient dwellings. From the fact that the hearth is found in the center he inferred that they were much like the conical wigwams of the modern Indians. Remains of this kind are common in middle and west Tennessee and in southeastern Missouri.

Farther south, during the explorations carried on under the Bureau of Ethnology, there have been found in many of the mounds layers of burnt clay broken up into fragments. From numerous facts ascertained in regard to these remains, which cannot be given in this abstract, and the descriptions given by early explorers of the houses of the Indians of this section, he argued that these were the remains of the houses of the mound-builders.

DISCUSSION.

Mr. JAS. H. BLODGETT said: I hope Prof. Thomas will heed the suggestion of Mr. Carr, whose recent work was referred to, and not suppress part of his own work because Mr. Carr has anticipated him in his statements. The public has become so thoroughly trained into the idea of a mysterious lost race of mound-builders that it will be necessary for every one who knows of facts indicating the contrary to state them on all proper occasions. Lately seeing a reference to the mysterious lost mound-builders in the manuscript of a prominent writer, I suggested to him that it might expose him to criticism, and referred him to one or two eminent names that endorsed the view that our red Indians were competent to do like work. My suggestion was the first information received in this author's office that any such view was seriously held and I was referred to an article in a standard Cyclopeædia some years old to inform myself as to the true view. I trust Dr. Thomas will add his testimony in its due place.

Prof. MASON said he had always wished to see this subject discussed by gentlemen who had had as much experience in the matter as Major Powell and Prof. Thomas. It seems that doubts are thickening more rapidly than the proofs are forthcoming. In his own mind he had no doubts upon the subject, but took this antagonistic stand for the purpose of drawing out such facts to enlighten others who were adherents of the belief that the mound-builders

were a distinct race, and one of greater antiquity than is now known to be the case.

Major POWELL said the paper by Prof. Thomas is a valuable contribution to our knowledge of the North American Indians. It opportunely falls in with the present lines of research in two distinct ways: First, as identifying the mound-builders with various tribes found on the discovery of this country; second, as an addition to our knowledge of the dwellings of the ancient inhabitants of this country.

At our last meeting we had an interesting paper from Mr. Holmes, who, from his studies, concluded that the mound-builders were no other than the Indians inhabiting the country. Last year we had a paper from Mr. Henshaw arriving at the same conclusion from the facts discovered in another field of research. And now Prof. Thomas finds that some of the earth-works of this country are domiciliary mounds, as suggested long ago by Lewis H. Morgan, who was the great pioneer of anthropologic research in America; and, further, that the houses found in ruins on the mounds are such as were built by the Indians, as recorded in the early history of the settlement of this country.

Thus it is that from every hand we reach the conclusion that the Indians of North America, discovered at the advent of the white man to this continent, were mound-builders, and gradually the exaggerated accounts of the state of arts represented by the relics discovered in these mounds are being dissipated, and the ancient civilization which has hitherto been supposed to be represented by the mounds is disappearing in the light of modern investigation.

But Professor Thomas' paper is valuable from the fact that it gives us a clearer insight into the character of the habitations of these people. The Indians of North America made their dwellings in various forms and of various materials. The rudest dwellings found in the country are those made by some of the Indians of Utah and Nevada of the great Shoshonian family. These are simple shelters made of banks of brush and bark, especially the bark of the cedar, piled up so as to include a circular space, but open toward a fire. Boughs near the summit of the bark project over a portion of this space, and bark and boughs are piled indiscriminately on all. Such a shelter is good protection against wind, and, to some degree, against snow and rain. But these same people occasionally build larger habitations with small posts and cross-

pieces, upon which wattles of willow withes are made, and the whole is covered with willows. I have known such a communal house to be built large enough to accommodate from seventy-five to one hundred and twenty-five persons—all the members of a little tribe—while at other times the same tribes have been found occupying the rude dwellings above mentioned. Nor have I been able to discover their reasons for changing from one to the other. This has been observed: that the communal houses are but rarely used.

Many of the Indians of California build houses made of wind-riven slabs and poles inclined against a central ridge-pole and banked with earth, sometimes but part way up the sides of the inclined pole, sometimes quite over the top. At one end of such a dwelling an aperture is left for the escape of smoke. The Navajos often build similar lodges, except that they are conical in shape and have a peculiar entrance—a kind of booth like a *porte cochère*. In the eastern portion of the United States, as among the Iroquois, large oblong house were made of poles and slabs. Many of these houses were communal. Around Pyramid Lake and in many other portions of the country their dwellings were made of reeds, called in the West *tules*. Sometimes these houses were made somewhat symmetrically of poles, into which the tules were woven as a kind of wattle. At other times they made fascines of the reeds and used them in the construction of their houses, and I have had described to me houses made of fascines and wattled tules on the shores of Pyramid Lake and other lakes of the West, and ofttimes built out over the water. In a large portion of the United States the climate is arid, and naked sandstone rocks appear in great abundance, while forests are very rare. In all of these regions the Indians built of stone. Sometimes they walled up the front of a cave, or built a house under an overhanging cliff, using the wall of rock behind as a part of the dwelling. Sometimes, where rocks were friable, they excavated chambers in the sides of the cliffs. The cliff dwellings and cavate dwellings are found in great abundance in New Mexico, Arizona, and some portions of Utah. Other dwellings have been discovered in certain hills of Arizona that are natural truncated cones. In such a case the summit of the hill is a volcanic breccia, exceedingly friable, through which shafts were sunk into a more friable breccia below. In this more friable rock extensive chambers were excavated, and the entrance to these chambers was through a shaft from above by means of a ladder. With the

extensive pueblos of that region you are all quite familar. To a very large extent it is observed that the arrangement of dwellings in a village is significant. In very many cases they are arranged by clans and phratries. When such an arrangement does not exist there is usually some other device taking its place. For example, among Muskokis, or Creeks, near the centre of the village, there is a square laid out in a very systematic manner with seats, or rather spaces for sitting, on the ground relegated in a particular manner to phratries and clans, so that the tribe was arranged, in the council held from time to time in the square, in a systematic order. Usually over these sitting places booths were erected, and the posts that upheld the booths marked in a more specific way the seats of the officers of the village. In connection with these council squares a very interesting council lodge has been discovered. The booths of the square did not furnish ample protection at all seasons of the year, and in order to meet their wants on such occasions a huge conical lodge was constructed of the tall trees of that country. Slender trees 50 or 60 feet in height were cut down, trimmed, and inclined against a central, standing tree. Thus a huge conical lodge, 50 feet or more in height, was constructed, under which the whole village could take shelter. Under this they gathered in inclement weather to conduct their dances. And just here it should be remarked that the Creek Indians have yet a tradition of a time when they built their houses with wattled walls, the interiors of which were plastered—exactly such houses as have been described by Prof. Thomas.

The subject of house-building among the North American Indians is one of very great interest, as the various tribes exhibited much skill in utilizing the materials at hand, whatever they might be—bark, poles, slabs, tules, skins of animals, stone, etc.

Prof. MASON further stated that he had handled thousands of Indian weapons, utensils, &c., and found that many objects occurred in the mounds for which no particular use could be now assigned.

Major POWELL replied that it was very doubtful, at this time, if anything existed that could not be explained through the survival of similar articles now in use among some of the more isolated tribes of Indians.

Prof. SCUDDER referred to and reviewed some of Prof. Putnam's investigations and discoveries at Madisonville, and referred specially

to the exhumation of figurines, pearls, meteoric iron, and rude plating of hammered silver.

Prof. THOMAS, in reply to Prof. Scudder's statement of what had recently been found by Prof. Putnam in certain Ohio mounds, stated that all of the types mentioned, except one, had been obtained by the assistants of the Bureau of Ethnology.

Major POWELL said: The discussion this evening has brought out many interesting facts relating to the early inhabitants of this country, especially to the dwellings which they occupied and to the antiquity of the ruins which have been discovered.

In 1856 or '7 I was making exploration of mounds on the shore of Peoria Lake, in Illinois, and I discovered in a mound a copper plate—a thin sheet of copper, cut in the form to represent an eagle. At the time I supposed it gave evidence of the superior civilization of the mound-builders. Some months after, in more carefully examining this thin copper plate, I discovered that it had been rolled and cut by machinery, and this led me to believe that it was not the manufacture of Indians, but that it was probably manufactured by white men. If the supposition were true it is manifest that the mound had been erected subsequent to the association of these Indians with white people. This was the first suggestion to my mind that the age of the mounds had been misinterpreted, and that the general conclusion that the mound-builders were not tribes found in this country on its discovery was erroneous. Since that time one line of evidence after another has led to the same conclusion. Some years ago I published this conclusion in general terms, and every year it is strengthened, and it may be fairly said at the present time that it rests on a sound inductive basis.

But this conclusion does not overthrow the belief that many of the mounds are of great antiquity. Domiciliary mounds, burial mounds, and mounds for many other purposes are discovered everywhere throughout North America in vast numbers, and doubtless the inception of mound-building dates far back in remote antiquity. The numbers of the mounds themselves testify to this conclusion, and the conditions under which many of them are found lead to the same opinion. To account for the great numbers of the mounds it is not necessary, but is in fact illogical, to assume a dense population. Length of time will give the same result; and I think it has been clearly shown that the number of Indians inhabiting the country at the time of its discovery by Europeans has been by many writers

enormously exaggerated. It is probable that at the present time the number of Indians in the country does not equal that of the time of the landing of Columbus. On the other hand, the disparity between the numbers of the two periods is not great.

But here I must be permitted to remark that ofttimes the evidence adduced to prove the antiquity of the ancient works discovered throughout the country is unsound. There is abundant evidence of antiquity—good geologic evidence. Stone implements are found in geologic formations to such an extent as to leave no doubt that this continent was inhabited by man in early quaternary time; but sound evidence must be clearly discriminated from much of the evidence which is adduced. Travelers and scholars sometimes talk very loosely on this subject. Let me illustrate this.

In the southwestern portion of the United States we discover in vast numbers the ruins of ancient stone villages. Often these ruins are found at sites where water is not now accessible, and hence it has been averred again and again that all this arid portion of the United States was at some early period densely inhabited, and that the country has been depopulated by increasing aridity. And this secular change of climate has been adduced as evidence of the great antiquity of these works.

In 1870 I discovered ruins on the Kanab Creek in Utah and some of its tributaries elsewhere in Utah and Arizona, away from the neighborhood of water, and, like many other travelers, it at first seemed to me that I had discovered evidence of change of climate. But my work in that region was that of the geologist rather than of the anthropologist, and I early discovered that such evidence is valueless. In that arid country years—perhaps tens or scores of years—will pass without great rains. During such times the larger valleys are filled with the materials brought down by the wash of rains and minor streams, and such accumulation in the valleys of this arid region is very often found. But there come at greater or less intervals storms of such magnitude, precipitating waters in such volume that the valleys themselves are cleared of the accumulated sands. When this is done streams flow through them for miles or scores of miles where they did not run before, and the few springs along the water courses are unmasked and yield a constant supply. And I have in my mind at the present time a ruin which I supposed to be far away from water, and which was far away from known water ten years ago, but at the foot of which to-day a beau-

tiful stream is running, this valley having been cleared of its débris not more than eighteen months ago. Abundant instances of this kind can be brought up.

Savage people abandon their homes for reasons not fully or easily appreciated by civilized men. Some disease carries off a great man or a number of persons in a tribe, and panic seizes the people and they leave their homes, perhaps burn them, under the belief that evil beings or evil influences have taken possession thereof. And this occurs very often. I have myself more than once witnessed the effect on a tribe of an epidemic or the mysterious death of a noted personage. For this reason the sites of Indian villages, even though dwellings may be erected of stone, are not very permanent; they are constantly changing. In the southwestern portion of the United States there are other causes for change, namely, those mentioned above—physical causes. A tribe settling on a flowing stream at one time may have that stream buried by drifting sands and the springs all masked and be compelled thereby to change their habitation. And such changes doubtless were frequent.

Again, we know that a people living in a central village build small summer residences scattered about the country by the sites of springs, where they cultivate their little crops of grain and other vegetables; so that a large group of such dwellings may be ofund gathered about some central pueblo—not giving evidence of a dense population, but only of the habits and customs of a small body of people. In such manner it may be shown that the extensive population of the southwestern portion of the country, based upon the evidence of the ruins so abundantly found, does not hold. A few people moving here and there from spring to spring and from stream to stream as pestilence and superstition and physical changes demanded would in many recurring centuries leave behind all the ruins now discovered. The antiquity of man widely scattered throughout this continent is firmly established on good geologic evidence, and it is not necessary to resort to evidence of doubtful character.

## Seventy-Sixth Regular and Sixth Annual Meeting, January 15, 1885.

Col. Garrick Mallery, President, in the Chair.

The Council reported, through its Secretary, the election of Mr. W J McGee, of the U. S. Geological Survey, as an active member, and Hon. Thomas Wilson, U. S. Consul at Nantes, France, as a corresponding member.

The annual report of the Treasurer was then read and submitted to the Society.

On motion of Major Powell, a committee was appointed, consisting of Messrs. Thomas, Dorsey, and Flint, to audit the report.

The Society then proceeded to ballot for the officers of the ensuing year.

The following is the result of the balloting:

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| President | J. W. POWELL. |
| Vice-Presidents | GARRICK MALLERY.<br>OTIS T. MASON.<br>LESTER F. WARD.<br>ROBERT FLETCHER. |
| General Secretary | DAVID HUTCHESON. |
| Secretary to the Council | F. A. SEELY. |
| Treasurer | J. HOWARD GORE. |
| Curator | W. J. HOFFMAN. |
| Council at Large | J. OWEN DORSEY.<br>EDWARD ALLEN FAY.<br>H. W. HENSHAW.<br>CYRUS THOMAS.<br>WESTON FLINT.<br>C. C. ROYCE. |

The amendment which had been duly proposed to the Constitution was then taken up and adopted as additional to Section I, Art. III, viz.:

"Corresponding members from whom no scientific contribution is received for two years after their election may be dropped from the list of members by a vote of the Council, but when so dropped shall be eligible to reinstatement."

SEVENTY-SEVENTH REGULAR MEETING, February 5, 1884.

Major J. W. POWELL, President, in the Chair.

The Council, through its Secretary, reported the election, as active members, of the following gentlemen:

John Jay Knox, Dorman B. Eaton, John M. Gregory, Edward T. Peters, Herbert H. Bates, Anton Carl.

The Curator read the following report of the publications received by the Society since the first meeting of the present session in November:

From the SOCIETY.—Bull. Buffalo Society Nat. History. Vol. IV. Nos. 1, 2, 3, for 1881, '82.

——— Wyoming Historical and Geological Society. Publication No. 7. 1883. Memorial. (Isaac Smith Osterhout.)

——— Ymer. Bull. issued by the Swedish Anthropological and Geographical Soc'y. Stockholm. 1883. Parts 1—6.

——— Bull. Anthropological Society of Paris. 6th vol., 3d Sér. Part 3. May and July, 1883.

——— Archivio, etc., from the Italian Society of Anthropology, Ethnology and Comparative Psychology. XIII, 2nd fascicule, 1883.

——— Annual Report of the Frankfort (Germany) Society of Geography and Statistics. 1881–1883.

——— Bull. of the Library Co., of Philada. Jan., 1884.

From the PUBLISHERS.—Science and Nature. An International Illustrated Review of the Progress of Science and Industry. Paris. Ballière et Fils. Dec. 29, 1883.

From the AUTHOR.—No. III. American Aboriginal Literature. Consisting of "The Güegüence; A Comedy Ballet in the Nahuatl-Spanish Dialect of Nicaragua. Edited by Dr. D. G. Brinton. Philada. 1883. 8vo. Pp. 94.

——— Aboriginal American Authors and their productions, especially those in the native languages. By Dr. D. G. Brinton. Philada. 1883. 8vo. Pp. 63. [This memoir is an enlargement of a paper laid before the last International Congress of Americanists, at Copenhagen, Aug., 1883.]

——— A Brief Account of the More Important Public Collections of American Archæology in the United States. By Henry Phillips, Jr. Philada. 1883. 8vo. Pp. 9.

From the AUTHOR.—Micrometry. By D. S. Kellicott. (Sec. Buff. Acad. Sci.) Chicago. 1883. 8vo. Pp. 23. Reprinted from the Proc. Am. Soc'y of Microscopists.

——— Der Bronze-Stier aus der Bijčí Kála-Höhle. By Dr. Heinrich Wankel. Wien. 1877. 8vo. Pp. 32. Map and plates.

——— Ueber einen prähistorischen Schädel mit einer Resection des Hinterhauptes. By Dr. Heinrich Wankel. Wien. 1882. 8vo. Pp. 19. 2 plates.

——— Ueber die angeblich trepanirten Cranien des Beinhauses zu Sedlec in Böhmen. By Dr. Heinrich Wankel. Wien. 1879. 8vo. Pp. 11.

——— Eine Opferstätte bei Raigern in Mähren. By Dr. Heinrich Wankel. Wien. 1873. Pp. 22.

——— Prähistorische Eisenschmelz-und Schmiedestätten in Mähren. By Dr. Heinrich Wankel. Wien. 1879. Pp. 40. 1 pl.

——— Wo bleibt die Analogie? By Dr. Heinrich Wankel. Wien. 14to page. [On rock inscriptions, found in Smolensk, Russia.] By Dr. Heinrich Wankel. Without date.

——— Urgeschichtliche Ansiedelung auf dem Misskögel in Mähren. By Dr. Heinrich Wankel. Wien. W. d.

——— Bilder aus der Mährischen Schweiz, und ihrer Vergangenheit. Wien. 1882. 8vo. Pp. 422. Ill.

From ERNEST CHANTRE.—Études Paléoethnologiques dans le Bassin du Rhône. Bronze Age. Paris. 1877. 8vo. Pp. 8. Ill. and chart.

——— The Burial Places of the First Age of Iron of the French Alps. Lyon. 1878. 8vo. Pp. 15. 60 fig. 3 pl.

——— Anthropologie. A Lecture. Lyon. 1881. Pp. 29.

——— Paleoethnologic Researches in Southern Russia, especially in the Caucasus and the Crimea. Lyon. 1881. 8vo. Pp. 27. Pl. 12.

——— Geologic Monograph on Ancient Glaciers, etc. MM. Fahan and Chantre. Lyon. 1880. 8vo. Vol. I. Pp. 622. Vol. II. 572. Ill. folio atlas. These volumes are replete with anthropologic material.

——— The Bronze Age. Researches on the Origin of Metallurgy in France. Paris. 1875. 3 vols. Folio. Profusely illustrated.

——— The First Age of Iron. Mounds and Burial Places. Lyon. 1880. Folio. Pp. 60, and 50 lith. plates

From Dr. HEINRICH FISCHER.—A Review of the II and III Parts of Trans. Royal Ethnographical Museum of Dresden; consisting of a work on objects of Jadite and Nephrite from various quarters of the globe. By Dr. A. B. Meyer. 4to. Pp. 9.

On motion of Col. SEELY a vote of thanks was passed to the donors of books and pamphlets mentioned in the Curator's report.

Mr. CYRUS THOMAS then read a paper entitled "CHEROKEES PROBABLY MOUND-BUILDERS."*

ABSTRACT.

The speaker commenced by referring to some discoveries made by Prof. Lucien Carr in 1876 in Lee County, Virginia, which, taken together with the historical data, led him to the conclusion that some, at least, of the mounds of this region were the works of the Cherokees. The evidence in this case consisted of the remains of a building of some kind found in a mound which must have corresponded very closely with the "Council House" observed by Bartram on a mound at the old Cheroke town of Cowe.

He next referred to some mounds recently opened by the assistants of the Bureau of Ethnology in western North Carolina and East Tennessee, the contents of which, together with the history of the Cherokees, induced him to believe they were also built by them.

Prof. THOMAS then entered upon the discussion of the early history of this people, the purport of which was to show that they had occupied this region at least as far back as 1540, the date of De Soto's expedition.

He then referred to the specimens found in the mounds alluded to, which he contended indicated contact with Europeans, exhibiting some of the specimens to the Society as evidence of the correctness of his conclusion, maintaining that if the mounds were built after the appearance of the Europeans they must be the works of the Cherokees, as they were the only people known to have inhabitated this particular section from the time of De Soto's expedition until its settlement by the whites.

As further proof of his position he referred to carved stone pipes, engraved shells, and copper ornaments found in these mounds precisely like those described by early writers as made by and in use among the people of this tribe; also to numerous articles of aborigi-

* Published in Magazine of American History. 1884. XI, 396–407.

nal and European manufacture dug up from the site of an old Cherokee town near the Hiawassee river, the former being precisely of the same character as those found in the mounds alluded to.

In order to show that these mounds could not have been built by the Creeks or more southern Indians he presented arguments to prove that the Etowah mounds in Bartow county, Georgia, were on the site of the town named by the chroniclers of De Soto's expedition Guaxule, which evidently from the narrative could not have been in the territory of the "Chelaques" (Cherokees). He then alluded to the construction of the mounds of this group, and to specimens found in one of them, (exhibiting some of the specimens), which showed clearly that they were built by a different people from those who erected the mounds of North Carolina and East Tennessee.

DISCUSSION.

Major POWELL said Prof. Thomas' paper furnished additional evidence that a number of our Indian tribes were primitive mound-builders. In relation to that part of the paper respecting the ancient habitat of the Cherokees, I have some curious evidence to offer. Some years ago I discovered that the Cherokees, Choctaws, Chickasaws, Muskokis, Natchez, Yuchis, and other tribes have among them the tradition of an ancient alliance for offensive and defensive purposes against the Indians to the west of the Mississippi river of the Siouan stock. In the grand council of the tribes mentioned the terms of an alliance were under consideration, and from day to day the subject was considered without arriving at a conclusion. The relation of the tribes to each other could not be adjusted satisfactorily to all, and it seemed likely that the council would break up without effecting an alliance. Now the savage state or body-politic is a kinship body; the ties are of consanguinity and affinity; and this is the only conception of a state possible to people in this grade of culture. So the disagreement arose about the terms of kinship by which the tribes should know one another, as this would establish their rank and authority in the alliance.

After many days had passed in fruitless discussion a Cherokee orator proposed a plan of alliance that has given him renown among all the tribes interested down to the present time. To those who have studied Indian oratory and the reasoning of Indian minds his plan and the reasons therefor are of great interest. He commenced

by describing the geography of the country inhabited by the several tribes in order from east, passing by the south to west, and passing by the north again to east. After describing all of this country—the mountains and valleys and rivers—he called attention to the fact that the rivers now known as the Savannah, the Altamaha, the Appalachicola, the Alabama, the Tombigbee, the Tennessee, and the Cumberland all head near one another in the mountain land occupied by the Cherokees; that the Cherokees, therefore, drank first of the waters of all the rivers, and that the rivers then passed from the land of the Cherokees into the lands of the other tribes to be used by them, and that, therefore, mother earth had signified their precedence to all the other tribes. He therefore proposed that the Cherokees should be the father tribe, and that the various other tribes should take rank as sons in the order in which the sun rose upon their lands—the tribe farthest to the east to be the first son or elder brother, the second tribe the second son, and so on. This geographical argument was at once recognized by all the tribes as being invincible, and the plan was immediately adopted.

Now this tradition serves us a double purpose. First, it exhibits the methods by which one tribe has called another, now here, now there, by terms of kinship, and that these terms of kinship do not signify that the people have traditions of formerly belonging to the same tribe, but that they give evidence of alliances having been formed by such tribes. The second point of interest, and that which bears upon the communication of Prof. Thomas, is this: That the traditions of all of these tribes place the Cherokees in the Southern Appalachian Mountains, about the sources of the rivers from the Savannah around to the Cumberland, this being the very territory which Prof. Thomas claims to have belonged to the Cherokees from historical evidence and evidence obtained from the mounds.

Mr. HOLMES exhibited and commented upon some delineations of the human figure in copper and on shell gorgets found in the mounds of Tennessee, remarking that the designs were not European but resembled the art of Yucatan, and if manufactured in Spain were made from designs furnished by those who had been in Yucatan, and if they were of European manufacture they were of no great value except to prove the intrusion of Europeans.

Col. SEELY remarked that the opinion that was gaining ground among American students, and particularly among the members of

this Society, as to the comparatively recent period in which mound-building was practiced, did not seem to be shared in Europe. He had just received from the Marquis de Nadaillac, one of our honorary members, and perhaps among Europeans the one person who kept himself best informed on all the developments of American archæology, the proof-sheets of an article in the *Revue d'Anthropologie*, in which he presented to European readers a *résumé* of Mr. Carr's recent work. While admitting the force of the facts set forth, the Marquis dissented from the conclusions, his particular reason for dissent being that the reversion to barbarism of tribes advanced in civilization was a thing unknown. He said a tribe or people partially civilized might be conquered by one more barbarous, and might become merged in it; but it had never been known that such a people, after once having fixed homes, agriculture, and arts of domestic life, had lost all these and fallen back to the barbarous condition of their conquerors. On the contrary, experience shows that the effect of such a mixture of races is to elevate the conquerors by imparting to them the arts and habits of the conquered people.

Col. SEELY read brief extracts from M. de Nadaillac's article, which concluded with very complimentary mention of the work of American explorers and an expression of belief that they would before long lead to a solution of the mystery of the mound-builders.

Major POWELL said: The criticism which Colonel Seely has read for us is interesting in various respects, but it fails to be valid by reason of a curious error. It is a great mistake to suppose that the Indians of North America were nomads. All of our Indian tribes had fixed habitations. It is true they moved their villages from time to time, because of their superstitions and for other reasons, but to all intents and purposes they were sedentary, living in fixed habitations from year to year, though from generation to generation they might change the sites of their towns. But of many of our Indian tribes because partly nomadic shortly after the advent of the white man, from whom they obtained horses and fire-arms. With horses they could easily move from point to point, and with fire-arms they could obtain a larger share of their sustentation by hunting than they had previously done, and many tribes gave up agriculture on this account. Instead of living in houses of wood and stone and earth they came to live more or less in skin tents.

If we attempt to mark off the progress of mankind in culture into stages, that which I shall call *savagery* is, in a general way,

well differentiated from higher stages. In this stage the state is organized by kinship. Tribes are kinship bodies. In the main, descent is in the female line—that is, mother-right prevails. In general, too, these people are in the stone age. They have not yet learned to use bronze; nor have they developed hieroglyphic writing. People in this stage of culture are called *savages*. When such tribes have changed their social structure so that father-right prevails, then the patriarchy is established. At about the same period of culture animals are domesticated, and doubtless the domestication of animals and the necessity for nomadic life which results therefrom is one of the most important agencies in breaking up mother-right and establishing father-right; and when father-right is established the patriarchy speedily follows. Such peoples we call *barbaric*, and the stage of culture in which they live *barbarism*. Barbaric people may be nomads; savage people are never nomadic. Some English anthropologists whose branch of investigation is confined chiefly to institutions, or, as we call it, "sociology," have traced back the history of Aryan civilization until they have discovered the patriarchy, until they find the early peoples from whom the present civilized States have descended in a state of nomadism—patriarchies with their great tribal families about them, together with their flocks and herds, all roaming from one district of country to another in search of pasturage and water. And they are accustomed to assume that this patriarchal condition, this nomadism, is the primitive form of society. Sir Henry Maine is one of the leading men of this school, and we are greatly indebted to his researches for the materials with which to trace the development of patriarchal institutions into national institutions. But there is abundant evidence to show that there are institutions more primitive than those of barbarism. The tribes of Australia and the tribes of North America and of South America are discovered to be in a state of culture lower and more primitive in structure than the peoples of early Aryan history. Herbert Spencer has in the same manner confounded tribal society, or savagery, with barbarism, and has entirely failed to understand the structure of the hundreds of tribal States of North America and of many others elsewhere throughout the world; and to him may be largely attributed the erroneous habit of calling the tribes of North America nomads. It should be distinctly understood that the North Americans are not nomads, that they have not the partriarchal form

of government, and that they have not domesticated animals. From this statement I must except certain tribes of Mexico and Central America, whose exact state of culture has not yet been clearly discovered. The criticism of the eminent author from whom our Secretary has read therefore falls to the ground.

Mr. WARD said he had looked up the exact meaning of nomadism under the impression that the term implied the state given by Major Powell. He had seen it used in the sense of a headless race, with no form of government, no arts, no domestic animals, therefore representing the lowest form of culture. The term was used in this sense by Mr. Herbert Spencer. There was some justification for the use of the term in this sense by European ethnologists. The meaning of the word does not involve domestic animals; it simply means to wander.

Prof. MASON said that the Cherokees might have been mound-builders, but the mound-builders were not all Cherokees. We cannot yet affirm that the ancestors of our modern Indians were the mound-builders of the Mississippi valley. He called attention to the fact that Dr. Brinton states that the mound-builders of the Missippi valley were Choctaws. He also spoke of the delicate and strange forms of objects in stone found in Ohio mounds and in immense stone graves compared with forms of articles made by modern Indians. There are many types of these mound-objects for which we have no names, because modern savages use nothing like them.

Major POWELL said there is no whit of evidence to show that the mounds were built by a pre-Indian people. For a long time it has been assumed that a great race of people inhabited the valley of the Mississippi anterior to its occupation by the tribes of Indians discovered by early European explorers, and it was claimed that these people had erected great earthworks of such magnitude that they could not be attributed to the Indian tribes, but that they must have been the work of people more highly organized. This error arose from the fact that early writers had no adequate conception of the character of tribal organization, and that kinship society is as thoroughly bound together, and perhaps more thoroughly, than that based upon any other plan. They also assumed that the works of art found in these mounds, or associated therewith, gave evidence of superior art. A careful examination of this theory has proved its fallacy. On the other hand, it has been discovered that the

works of art in the mounds are in no whit superior to the arts of the Indians discovered in this country. On the other hand, the Cherokees, Choctaws, Chickasaws, Muskokis, Shawnees, Mandans, Wintuns, and Siouans, and probably many other tribes, are known to have built mounds for domiciliary and burial purposes. The earlier explorers found tribes of Indians occupying and using mounds — the Natchez, Cherokees, and others; and the result of the last few years of investigation is this: That there is no sufficient reason, and in fact no whit of evidence, to show that this continent was occupied by a people anterior to its occupation by the Indian tribes, a people of a higher grade of culture. On the other hand, some tribes of Indians are known to have been mound-builders. We have not yet discovered what particular tribes built many of the mounds; nor is it possible to discover when they were built — that is, to fix with acccuracy the date of their erection. Some of them have been built within the historic period — doubtless but very few compared with the whole number — and some of them are doubtless of great antiquity. And during all the centuries of history when these mounds were erected some tribes may have been destroyed, and there may be mounds built by tribes whose history is lost. Some of the Indian tribes occupying the continent at the advent of the white man were mound-builders and a few mounds have been built since that time. The great number were erected prior to that time by these tribes, and perhaps by others still existing, but of whose mound-building we have yet no knowledge, and still others may have been built by tribes that are lost.

This seems to be the inevitable conclusion from the researches of the past few years, and the theory that a more highly cultured people inhabited this continent anterior to its occupation by the red Indian falls to the ground.

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SEVENTY-EIGHTH REGULAR MEETING, February 19th, 1884.

Major J. W. POWELL, President, in the Chair.

Mr. DORSEY, in behalf of the committee appointed to audit the Treasurer's accounts, then reported that the accounts had been examined and found to be correct. The report was accepted by the Society.

The Secretary of the Council announced that the President had designated the Vice-Presidents to their several sections, as follows:

Dr. Fletcher, Section of Somatology; Mr. Ward, Section of Sociology; Col Mallery, Philology, Philosophy, and Psychology; Prof. Mason, Technology.

Mr. WARD then read a paper entitled "MIND AS A SOCIAL FACTOR."*

ABSTRACT.

It was maintained that, notwithstanding the general disposition to exalt and deify the mind, still this had thus far amounted to little more than lip-service, and that the real power of human intellect as the lever of civilization was not merely ignored but practically denied. Touching lightly upon the metaphysical school of philosophy, of which this had always been true, he directed his main argument against the now far more powerful influence in the same direction which the most advanced scientific thinkers are exerting. The tendency of the evolutionists to contemplate man solely from the biological standpoint, and to treat society as a simple continuation of the series of results accomplished by evolution in the lower departments of being, was strongly condemned. Himself a consistent evolutionist, and firm believer in the doctrine of man's descent from humbler forms of existence, Mr. Ward still cogently maintained that in studying development an entirely new set of canons must be adopted the moment the phenomena of the human intellect present themselves for consideration. Henceforth a new factor, wholly different from any before employed, enters into the problem, and correspondingly new and distinct methods of research must be adopted. Just as the biologist finds in the advent of life on the globe a new and enormous factor such as compels him to investigate the organic world with an entirely new set of principles and methods from those that are applicable to physics, chemistry, etc., so, Mr. Ward maintained, when the developed psychic faculty appeared a second change of base in science, equally thorough and complete, was imperatively demanded. The failure of modern philosophers, headed by Mr. Herbert Spencer, to recognize this patent truth had led to the let-alone doctrine, which possesses a certain fascination

* Published in full in "MIND" (London) for October, 1884, pp. 563–573.

and justifies individual aggrandizement, and hence is making rapid inroads into the popular habit of thought. This *laissez faire* philosophy, which Mr. Ward characterized as the "gospel of inaction," is, in his opinion, distinctly negatived by the most advanced science, is contrary to the very law of evolution, and its legitmate workings almost justify Carlyle in denouncing the whole philosophy of science as the "gospel of dirt."

As against such sordid teachings Mr. Ward held: That without apotheosizing the mind, without denying its humble origin and slow development, it is still the greatest fact in the universe, produces the grandest results achieved on the globe, and in and of itself makes man the supreme arbiter of his own destiny, the great independent agency of the world and master of the planet.

DISCUSSION.

Prof. THOMAS remarked that for a clear comprehension of the problem presented in Mr. Ward's paper a definition of what he meant by mind was necessary. He cited illustrations to show that animals and even insects have memory and reasoning powers—in short, mind. What then, he asked, is the human as distinguished from the brute mind?

Prof. WARD, in reply, said that so far as the purposes of the present paper were concerned the only definition of mind necessary was the one given in the course of the paper, viz., that it was the inventive faculty of man.

Mr. WELLING expressed his general concurrence in so much of Mr. Ward's paper as might be said to convey the positive and affirmative propositions of the writer, but intimated the opinion that on a deeper analysis and closer inspection it would be found that the dissidence between Mr. Ward and the scientific expositors of the naturalistic school was not so great as might be inferred from the terms of his negative criticism. That dissidence was perhaps formal rather than real, being, as between him and his opponents, a question of nomenclature rather than of substance—or, to speak more definitely, a question as to the precise point in the evolutionary process where the logic and nomenclature of the naturalistic school might be held to apply to the facts of psychic activity in the figure of human society. In so far as mind might be said to have a physical basis, Mr. Welling said that he saw no reason why the human organism should be exempted from the law of a physical natural selection and

survival, but at the same time it was very clear that we were not to look to man's *physical* organism for the highest expressions of that natural selection which was peculiar to him in the animal world. Regarded apart from all disputes as to their genesis, and considered simply in their functions, it might be said that a *plant* is a machine for coördinating a certain number of natural forces, and thereby lifting them above the realm of the inorganic nature which is below it; that the *animal* organism is a machine for coördinating another bundle of natural forces and thereby lifting them above the level of the plant world, and that *man* is an organism in which the vegetable and animal constitution simply lays the basis of a higher series of activities, in proportion as the natural forces below him are coördinated and transmuted by that which in him is highest—his *mind*. It is, therefore, in the creations of the human mind that we would naturally look for the natural selections and survivals which are most distinctive of man and most descriptive of his place in nature. If the place of man in nature and the place of mind in man be so regarded, it does not seem necessary to assume that there is any reversal of the logic of evolution when we come to study the phenomena of human society. It is not a reversal of this logic and nomenclature, as Mr. Ward seems to think, but a transference of that logic and nomenclature to a higher sphere of action—the action of man in society under the forces of an expanding science and a growing morality. It is in *these*—that is, in the rational and moral forces, which are dynamic in society—that we must look for the natural selections which are relatively the fittest to survive at any given stage of human history. And in properly coördinating the rational and moral forces by which he is lifted above the brutes of the field, it is just as important that man should act *with* the forces of nature below him and in him as that he should in a measure act *above* those lower forces by virtue of his mind—his "faculty of execution," as Mr. Ward calls it. And in making the purely artificial regulations which belong to him as "a political animal" he is perpetually in danger of making civil, political, and economical adjustments which sin against the laws of nature and against the natural rights of man. Against all adjustments which unduly restrict the natural freedom of man in his mind, his body, or his labor, we may therefore justly hurl the doctrine of *laissez faire*.

Mr. WELLING then proceeded to illustrate this point of view by citing the phenomena of political economy as presented to us in

France during the reign of Louis IX, when every branch of industry in the kingdom was put under governmental regulation and restriction. These regulations and restrictions were imposed in the name of a state-craft which assumed to be wise *above* the laws of natural production. They were the expressions of an artificial selection working against the natural selections of supply and demand in the figure of political economy, and it was in opposition to the enormities of this system that the school of political economists known in France as the *physiocrats* rose at the close of the 18th century to make their indignant protest in the name of *laissez faire*. And in subsequent times as well as in other lands there had been abundant room to challenge the tariff regulations of any given epoch in the name of the same watchword.

Shall we say, then, that the maxim of *laissez faire* is final in political economy? By no means. It is final as against the pretension that man, by legislative artifice, however ingeniously devised, can make any industry profitable to the commonwealth against the forces of natural production. But in so far as man has higher ends in society than the creation of wealth the maxim is *not* final. If there be those who, in the name of a naturistic philosophy, would plead for the right to grind up the bodies and souls of men in the natural pursuit of wealth, it is easy to see that such a false and one-sided adjustment of economical relations would but call for a new evolution of public intelligence and public morality, as seen in the preventive justice which should be devised in order to guard the community from such excesses of the *laissez faire* doctrine. But neither the public intelligence nor the public morality can have a full field for the exercise of their natural prerogatives in the sphere of public economy until *laissez faire* has allowed the forces of natural production to exhibit the full measure of their strength, without let or hindrance, save such as may be neeeded to guard interests higher than the material wealth of a nation.

Major POWELL: The paper by Prof. Ward has been of great interest to me, as well as the discussion which it has elicited. In the progress of institutions it often becomes necessary that the old should be torn down in order that the new may be erected on the same ground; and in every great civilized land there are those who devote themselves to destruction, while others engage in construction. The theory of the destructionist has of late years obtained much vantage-ground from the doctrines of evolution, and the com-

munication of this evening very clearly sets forth the improper use of the established doctrines of evolution by a class of philosophers who fail to appreciate fully the necessity for construction *pari passu* with destruction and who have lost faith in human institutions and neglect the teachings of all human history.

The Lamarckian doctrine of evolution was that of adaptation by exercise. The hypothesis did not obtain wide acceptation until it was expanded more fully by Darwin and his contemporaries into the further doctrine of the survival of the fittest in the struggle for existence through competition in enormously overcrowded population. By this latter philosopher it was shown that competition performed an important part in evolution, and that the Lamarckian method gained its efficiency through the law established by Darwin. Among the lower animals species compete with species, and individuals of the same species compete with one another, and as the number of individuals produced is greatly in excess of those which can obtain sustentation some must necessarily succumb, and in the grand average it is the unfit that yield their places to those better fitted to the conditions. With mankind this competition does not perform the same office that it does with the lower animals, and this by reason of the organization of society and of other human activities, whereby men, to a greater or less extent, become interdependent, so that the survival of one depends upon the survival of others, and the welfare of one upon the welfare of many. But competition still plays an important part in the life history of the human race. Man in his competition with the lower animals has so outstripped them in skill and power that he utilizes them for his wants. He destroys some, and others he domesticates for his purposes. It cannot properly be said that he longer competes with the lower animals—in fact, he utilizes them.

But man competes with man, and this competition is expressed in warfare—public and private. In public warfare state competes with state, and the question arises, does this competition, this warfare, ultimately result, in the average, in human progress? So far as it is a competition between states do the higher and better people survive, and the lower people succumb? He would be a bold man, indeed, who would assert that the victor is always the superior man in culture, and who would divide and relegate the victories of the world to the good and the bad, the wise and the unwise, the just and the unjust. It is a task too delicate for any-

thing but omniscience. But we may look upon it in another light. In the grand average the individuals who engage in warfare are those who are physically strong, and, as judged by the standards obtaining among their own peoples, they are the patriotic and the noble, and it has usually happened that the flower of the state has been absorbed in its armies. This is less true in modern warfare, but is more true as we go farther backward in the history of mankind. The strong, the brave, and the patriotic have fallen in battle; the weak, the cowardly, and the selfish have survived; and thus warfare has been a constant drain upon the best of all lands; and it may be confidently asserted that human competition by warfare has in this manner failed to be an agency for human progress. Often warfare has been the means of overthrowing unjust and unwise institutions, and in this manner warfare has ofttimes resulted in good in human progress. On the other hand the period of warfare, the time in which peoples are engaged in warfare, is usually a time when the institutions of a people lapse from a higher to a lower condition. The necessities of war ofttimes furnish the excuse and justification for the establishment of institutions, or for modifications unjust and tyrannical in character. In the main war periods are times in which public morals lapse toward barbarism.

If we turn to consider the effect of private warfare on the progress of mankind we again fail to discover an efficient agency in human culture. He would indeed be a bold man who should assert that it results in the survival of the fittest, and who would relegate murderers to the class called the best, and the murdered to the class called the worst.

But mankind engage in another form of competition. They compete for welfare or happiness; and in so far as it is true competition, as distinguished from honorable rivalry—that is, in so far as one man succeeds at the expense of another—in just so far is injustice done; for, by the establishment of interdependence among men, the welfare of one properly depends upon the welfare of others, and the essential characteristic of justice, for which all mankind have striven, is this: that no man shall reap advantage to the injury of his neighbor. Competition for welfare, in the sense in which the term is here used, is the prosecution of injustice, and to the extent that justice is established competition is avoided.

There is yet competition of a third class. Arts compete with arts, and in the average the best are selected, and the choice is

made by men themselves. Men do not choose the best men but the best arts, and indirectly choose the men as best because they represent the best arts. So, institutions compete with institutions, and the best are chosen in the average. So, languages and methods of expressing thought compete with languages and methods of expressing thought, and in the average the best are chosen. In like manner opinions compete with opinions, and in the grand average the best and the true are chosen. Now, arts, institutions, languages, and opinions are human inventions, and in every department of human activity, as thus represented, inventions compete with inventions, and as in the grand average the fittest are chosen, so those who represent the best, the fittest, achieve success as compared with others who represent inventions of less worth. In this field there is legitimate competition, and it is by this competition that man progresses in civilization; but it is the objective invention or activity that survives, not the subject man. Now that class of sociologists who appeal to the established facts of science relating to competition, and use the laws of competition as they are exhibited in the lower animals, as if they properly applied to man, use them for destructive purposes, to destroy institutions, and they use them illegitimately, for human progress is not made by competing for existence, or by directly competing for welfare, but only by indirectly competing for welfare through the direct competition of arts, institutions, languages, and opinions; and in order that this indirect competition may be efficient all such competition must be in conformity with the principles of justice. Therefore, institutions designed to establish justice among mankind cannot properly be judged by the canons derived from the laws of competition, but only by the canons derived from the principles of justice, for the efficiency of competition itself in human progress depends primarily on pre-established justice.

The destructionists who thus illegitimately use the doctrines of evolution in their warfare against all human institutions to a large extent deny the efficiency of altruistic motives. They do not clearly see that wise egoism is wise altruism, because they do not clearly understand the interdependence of mankind; and in denying the extent and efficiency of altruism they neglect the best side of human history. Man inherited altruism from the beast. The she bear loves her cubs, the lioness her whelps, and the eagless her eaglets, and beast, bird, and insect alike exhibit altruistic motives. Among

the lower animals the group is very small indeed between the individuals of which such sentiments prevail; but steadily in their progress from savagery to the highest stage of civilization men have enlarged the group, as the small kinship group has expanded into larger, the clan into the tribe, the tribe into the confederacy, and confederacies and confederated tribes into nations; and altruism has expanded from smaller group to larger group, from family love to patriotism, and from patriotism to humanity; and in the light of the past we may safely prophesy of the future that this altruism will improve in quality and expand in scope until every man shall recognize in every other a brother in whose welfare he has an interest as deep as in his own, and when the doctrine of *laissez faire* shall be known no more forever.

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SEVENTY-NINTH REGULAR MEETING, March 1, 1884.

Major J. W. POWELL, President, in the Chair.

The President announced the resignation of David Hutcheson, as General Secretary of the Society, and the election by the Council of S. V. Proudfit to fill the vacancy.

Ensign ALBERT NIBLACK, U. S. N., read the following paper on "THE SMITHSONIAN ANTHROPOLOGICAL COLLECTIONS FOR 1883."

With the exception of the year 1876, when the material was received from the Centenial Exposition, the accessions for 1883 exceed those of any other year both in number and value. As the annual appropriations are only made by the Government for the preservation of the collections in the National Museum, it is proper to refer most of the collections to the Smithsonian Institution, as the Museum is under the control of the latter. The sources of last year's receipts were as follows:

Donations; exchanges; collections by Government expeditions, required by law to be turned over to the Museum; purchases for the Fisheries Exhibition from a fund specially appropriated, and purchases from a fund of $3,000 or more, which the Secretary has been able to save from various sources for this purpose. The last named has been so judiciously applied and combined with other Government work as to have enabled the Museum to acquire most valuable collections, of which this sum spent represents but a fraction of their

real value. Various branches of the Government have contributed to this result by allowing their employés in the field to make collections for the Institution in connection with their regular work. It is to be hoped that the valuable results attained with such a small additional outlay will induce Congress to make some of the annual appropriation for the Museum also avaliable for the "*increase*" as well as the "preservation" of the collections. In fact, the Museum cannot grow in proportion to the demands of the public from the sources it now has to rely on. Those considerations which call for the existence of the Museum at all also call for a liberal fund with which to send out collectors and purchase valuable material.

The collections here considered are those entered in the catalogue during 1883. Some of the collections were actually made in previous years, but they have been stored and are now heard from for the first time.

In the organization of the National Museum, as outlined in the "Proceedings" for 1881, it is contemplated classifying the anthropological material under three departments: I, *Antiquities;* II, *Races of Men;* and III, *Arts and Industries.* The Assistant Director is Curator of the last named and Dr. Rau of the first; but otherwise the work embraced under the second department, "Races of Men," is really carried on under Arts and Industries under the general supervision of the Assistant Director.

The general routine work is as follows:

Collections, on receipt at the Museum, are acknowledged and given an accession number by the Registrar, who files under this number all manuscript accompanying the various collections. Each collection is classified or divided up and the proper portions sent to the various departments or sections, where each specimen or lot of similar specimens is entered in the ethnological catalogue and given a Museum number, which is painted on the specimen for its future identification. The entry in this catalogue is briefly made under the following heads:

Museum Number; Collector's Number; Name; Locality; When Collected; Nature of Object; Accession Number; Measurements; Received from or Collected by; Cost; When Entered; Number of Specimens; Remarks.

The descriptive cards to be printed to accompany each specimen are then written, access being had to the manuscript in the hands of the Registrar to get full data, and the collection is arranged and sent to the preparators for installation in the Museum.

ACCESSIONS FOR 1883, DEPARTMENT OF ANTIQUITIES.

Five thousand three hundred and thirty-nine specimens were received, making a total now on hand of 40,491. Three thousand five hundred and fourteen different specimens were placed on exhibition, making a total display of 24,731. The purely ethnological material is being gradually taken over to the Museum building, and soon the entire main hall of the Smithsonian building will be devoted entirely to antiquities. The great bulk of the collections in this department are in storage, and of this the material on hand for exchange is very large.

The greater part of the receipts this year are miscellaneous collections from all over the world (France, India, Alaska, Central America, and Mexico), but principally from our own country and presented by patrons of the Institution.

The principal foreign collections are as follows:

Two hundred specimens from Ometepec Island, Lake Nicaragua, by C. C. Nutting, who was sent out by the Institution. It embraces remains from graves, such as clay vessels, arrow-heads, and rude stone carvings. The collector only got these incidentally, as his principal collection was the birds of that region.

A collection from Los Novillos, Costa Rica, by M. C. Keith, embracing about 15 rude stone images or carvings of human figures. These are now mounted in the National Museum. A collection of casts from the paper moulds received from the Trocadero Museum, Paris, made by M. Charnay and presented by Mr. Lorillard to the National Museum. The collection is too familar to all to need any comment at my hands. There are about 82 reproductions of inscriptions, carvings, temples, altars, door-posts, etc., from *Palenque*, Mexico, *Merida*, Yucatan, *Chichenitza*, *Lorillard City*, and other less important places.

A small collection of about 15 specimens from Alaska, collected by McKay just before his death, which will be alluded to later. The collection embraces only a few Eskimo stone implements and carvings.

So far this year (1884) a collection has been received from J. J. McLean, of the Signal Service, from the shell heaps of Cape Mendocino, Cal., besides the usual number of miscellaneous articles donated to the Institution.

In the Department of Arts and Industries the various sections have

not as yet all been put in operation. The well-organized special sections are at present only two, *materia Medica* and *Foods and Textile Fabrics*. The fisheries section is well-organized as a sub-section, so to speak, but it will be some time yet before hunting can be taken up in connection with it.

Dr. FLINT has the *materia medica* collection well in hand. In a general way it is intended to illustrate the medicines in use in highly civilized countries at the present day, as well as the collections peculiar to certain countries. Of the latter the Museum has a small collection from Corea, one from China, and quite a complete one from India. (This India collection of course represents only native medicines.) To the collection in 1883 were added over 1,000 specimens, the addition to the general collections being supplemental —*i. e.*, intended to fill out the present exhibit of the medicines of civilized nations obtained from wholesale drug houses in this country. Quite a unique collection of mineral waters from all parts of the world is included in the latter. The additions to the special collections in 1883 may be summed up as follows:

1. About 275 specimens from the Kurrachee Museum, India.
2. Fifty specimens or more from the Madras Museum.
3. Ten specimens of Cinchona bark of different kinds from Ceylon, presented from the Government of India.
4. Seventeen specimens presented by the Corean Embassy.
5. 110 accessions from the Royal Botanical Gardens at Kew.

The Section of *Foods and Textile Fabrics* embraces more than the name implies—*i. e.*, food-stuffs, narcotics, distillations, drinks, furs and leathers, fibres, cordage, textile fabrics, needle-work, basket-work, paper, etc. Mr. Hitchcock has been in charge only since November, last. The collection of textiles now on exhibition is not a very large one, and consists mainly of the raw materials used, such as *wood*, *silk*, *cotton*, *jute*, *manilla*, *hemp*, *bark*, *grasses*, etc. In mats, cloths, etc., little has been as yet installed. The reserve collection is a large and valuable one. The Zuñians, Navajos, Indians of northwest coast, (particularly the Nootkas and Haidahs,) the South Sea Islanders, and the natives of the Phillipines, West Indies, Central America, and elsewhere are well represented, and when this collection is finally installed it will be a valuable addition to the collections on exhibition. Little attempt has as yet been made to illustrate the fabrics of civilized nations, but these are easily obtained when desired by purchase in this and other countries.

The collection of North American Indian foods, embracing over 250 specimens, is classified and on exhibition. The descriptive cards are in the hands of the printer. There are small classified collections of foods from China, India, and other countries, but the miscellaneous collection has not as yet been classified. In representing the foods of civilized nations, specimens can be obtained very readily when desired. At present the principal collection of such foods is one prepared for the Fisheries Exhibition. It will form a part of that exhibit in the Museum, as only a few representative specimens will be kept out to go with the food collection proper.

The large collections of the Bureau of Ethnology from Zuñi and the Moquis and New Mexican pueblos were, last November, turned over to the National Museum for installation. On the publication of notes by the Bureau, and on the return of Mr. Cushing from Zuñi, these collections will be written up. Not enough is known of the ceremonial material to attempt such a thing at present. The collection of pottery is simply exhaustive. It is now in the hands of Mr. Holmes, as is the entire pottery collection of North America. Incidentally, it may be mentioned here that a fine collection of pottery was also received from Chiriqui, and is now installed with the North American pottery.

The general Zuñi and Moqui collections comprise 6,370 entries for 1883, but as three or four specimens are sometimes entered under one number, this does not approximate to its real size. It embraces basket ware, pottery, gourds, grinding stones or mortars, weapons, and ceremonial, household, agricultural, and industrial implements.

A large portion of the archæological collections of the Bureau of Ethnology from the mounds of the United States was also turned over to the Department of Antiquities some months since. No mention of these specimens was made under that head. Prof. Cyrus Thomas has worked up these collections, and the results are published under the Bureau of Ethnology. Collections have been made under the Bureau, throughout all the important localities from Dakota Territory to Florida, and from Nevada to the New England States. These collections of aboriginal remains embrace skulls, bones, celts, fragments of pottery, and walls of dwellings, shells, copper and iron implements, flints, flakes, pipes, arrow-heads, perforated tablets, stone discs, ceremonial stones, etc.

The entries for 1883 comprise 3,544 numbers, which is much more

than the accessions of the Department of Antiquities itself, when we consider that several of specimens are entered sometimes under one number. Four specimens of quartz celts from near Madras, India, are among the accessions from the Bureau.

Among the most important collections made by employés of the Government, in connection with their regular work under other branches, and which were paid for out of the fund previously alluded to, may be mentioned:

A collection from Wm. J. Fisher, the Coast Survey tidal observer on Kadiak Island, Alaska, who made several trips on the peninsula and mainland. It embraces about 100 specimens, the most interesting being some heavy elaborate bead-work head-dresses, some of them weighing as much as 2¼ pounds.

The collections made by the United States Signal Service observers are as follows:

1. One, by C. L. McKay, from in and around Bristol Bay, north of the Alaska peninsula, from the Nushagag-mut and Ogulmut Eskimos of that region, about 45 specimens in all, including a full outfit for a Beluga whale-hunter. which was exhibited in London last year. This outfit includes harpoons, lines, buoys, extra heads, killing lances, etc. A second collection of about 50 or 60 specimens, consisting of household utensils and articles of personal adornment, were received after the death of McKay. He was drowned in April, 1883, while out in a *kyak* in Nushagak river in bad weather.

2. One, by J. J. McLean, from around Sitka, which had been pretty well worked up by other collectors. Besides the usual lot of wooden carvings, kantags, or wooden dishes, etc., there are some fine specimens of native wicker and basket work in the collection (made from a species of plant, *Iris tenax*).

3. A *kyak*, with complete fittings, from Greenland, deposited by the chief signal officer of the army. (It was exhibited in London.)

4. The Point Barrow collection, which was brought down when the expedition returned recently. The collection is a good one, and embraces over 700 specimens. Mr. Murdock is now working up the collection, and I will not anticipate his report. Part of the earlier collection which came down on the "Corwin" went to London to the Fisheries Exhibit.

5. Mr. Stejneger, of the Signal Service, made a small collection from the Aleuts on Behring Island, Commander group (off the coast

of Kamschatka). There are some interesting models of fox and bear traps and boats, some seal-skin costumes worn in their native dances, besides some accessories of costumes peculiar to the Aleuts.

6. A collection coming more properly under 1884 was received several weeks since from L. M. Turner, of the Signal Service, from the Eskimos of Ungava Bay, North Labrador. It is a fine one and embraces over 450 specimens. The articles have not the oily, used look that most Eskimo implements have, which indicates that other collectors have been among them recently, although a great many specimens are models of traps, snow-shoes, tobogans, and spears, and are necessarily new. There are some large tobogans and snow-shoes of a peculiar pattern that will be alluded to below. The costumes are peculiarly handsome, and show the effects of contact with civilization.

A second collection from Fisher, made in the Aleutian Archipelago and Alaska Peninsula, has just been received. It consists of about 120 specimens of costumes, peculiar Aleutian hats, household utensils, accessories of costume, etc.

Among the small purchased collections may be mentioned: A Zuñi sacred blanket, one hundred Peruvian water-bottles or huacas, and some shoes, hats, dishes, baskets, etc., (from the La Costa Indians of South California,) woven of mescal fibre and palm-leaves.

1. Among the principal donations are 40 musical instruments, supplemental to the set of American musical instruments, all presented by M. J. Howard Foote, of 31 Maiden Lane, New York.

2. The original Catlin collection of Indian portraits, etc., painted by him during his eight years amongst the 48 tribes, of which he has handed down to us these most valuable ethnological records. There are about 500 in the collection which Mrs. Harrison, of Philadelphia, has so generously presented to the Institution. One hundred and fifty have been selected and placed on exhibition in the lecture room of the National Museum, and arrangements are being made to increase the exhibit. The selection now exhibited is one from each small tribe, two or more from the important tribes, and a set illustrating hunting scenes, ceremonial dances, etc.

3. At the close of the Boston Exhibition recently some 50 musical instruments, numerous clay figures, and various other specimens were presented to the Institution by Surindro Mohun Tagore, Rajah of one of the provinces of India and president of the Bengal music school. The collection of musical instruments is accompanied by

full notes, and the Museum is taking steps to obtain a supplemental collection to complete the series. This collection was installed a few days since and is now on exhibition.

Among the principal *exchange* collections are:

1st. Some miscellaneous weapons from Polynesia and South America, obtained at the Fisheries Exhibition.

2d. Some 16 musical instruments and accessories from Tiflis, in the Caucasus, obtained through Mr. Engleman, of St. Louis.

3d. About 40 specimens from the Leipzig Museum, consisting of knives, bows, arrows, baskets, mats, etc., from Africa, particularly the Loango Coast and Gaboon river, on the west coast. The admirable native steel implements are well illustrated. This collection, combined with a few stray or miscellaneous articles and a small collection by Rev. Dr. Gurley, constitutes but a meagre African ethnological exhibit.

The Museum has just sent to the Trocadero, at Paris, an ethnological collection selected from the material in its possession, and doubtless their exchange will embrace some additions to the above.

Mr. J. G. SWAN, in addition to the regular collection which he sends in from time to time, made last summer a special trip for the Smithsonian Institution to the Queen Charlotte Islands, B. C., and the results have just been received.

In the early part of the year he sent in some photographs and about 100 specimens supplemental to his series of collections illustrating the fisheries of the Indians in and around Cape Flattery, W. I. (The complete collections went to London.)

In the trip referred to above he started from Masset Sound (N. Graham Island) and coasted around the west side, then through Skidegate Channel to the southeast coast; then home to Victoria. Now that he has partially carried out his long-cherished desire, it is to be hoped that his forthcoming notes will prove as valuable as his notes previously published. A better knowledge of the *Haidah* totems and totemic carvings is desired. The collection is rich in masks, wood-carvings, ladles, ancient stone implements, ropes, clubs, shaman's wands, ceremonial bows, whistles, rattles, fishing gear, etc., but particularly so in the slate carvings, of which he sends 30 specimens—dishes, boxes, and models of totem posts. There was already on hand a sufficient number of specimens to illustrate the *Haidah* wood carvings and working in silver, but the additions to the slate carvings have made it appear desirable to install the

latter as a monographic collection illustrating this art, which alone places the *Haidahs* at the head of the Indians of the northwest coast.

A comparison and study of all the carvings from the *Haidahs* is to be made, as it is difficult for the uninitiated to make out or distinguish between the conventional representation of animals. The *Haidah* totemism and mythology offer a most promising field to investigators.

Mr. Swan is anxious to make another trip, during the coming season, a attend to great celebration to be held in the fall. The Director has the matter now under consideration.

The Fisheries Exhibit, having returned from London, is now turned over to the Museum, and will form a monographic collection. The Makah Exhibit, collected by Swan, and the Eskimo, whale, seal, and walrus hunting outfits are peculiarly interesting to anthropologists.

In the matter of exchange, the Museum has recently sent to the Trocadero, at Paris, a small collection of models of ruins and cliff-dwellings, ethnological material from *Zuñi*, *Moqui*, and our Western Indians. The Museum has available for exchange a great deal of material from the collections of the Bureau of Ethnology and the northwest coast and Alaska collections.

In the matter of collecting every year increases the value of ethnological material. When Congress shall wake up to the necessities of making more liberal appropriations it will be found that it has been false economy to delay in the matter. A few thousand dollars now will represent a much greater outlay in future years.

The outlook for anthropological collections for 1884 is not so encouraging. Fisher, McLean, and Swan will be the main sources. No one has yet taken McKay's place, and Nelson has permanently withdrawn. Greely's party must have abandoned their collections North, and the present relief expedition can hardly accomplish much. Foulk and Bernadon may be heard from in Corea.

As stated originally the year 1883 has been a prosperous one for the Smithsonian and National Museum.

## REMARKS ON THE CLASSIFICATION AND ORGANIZATION OF THE NATIONAL MUSEUM.

As a rule the earlier collections have lost much of their value, both from the want of care in preserving the accompanying data,

and from the absolute neglect of the collectors to forward any. A little preliminary experience of collectors in the Museum, before going into the field, would impress it forcibly on the minds of such that the descriptive cards should be practically written by the collectors in the field. Nelson and Swan have shown the best realization of this principle. The general form of the descriptive card adapted to the Museum, to accompany each specimen exhibited, is as follows:

> Object, (local or native name). _____Materials of which made; brief description; use. *Tribe* or person by which used.
>
> Dimensions, length,_____, breadth,_____, etc.
>
> Exact locality, 18—, (date of collection). Museum number.
>
> How and through whom acquired.
>
> Fuller and more special notes in smaller type are appended as to origin, special variation in form and use in various localities, notes on the general series of which the specimen is a representative.

Each object or general series of objects is to be accompanied by such a label or card further supplemented by pictures or photographs when necessary to more clearly illustrate how the object is used or worn, or to show pattern where the object is folded or obscured. The cards are printed on herbarium board. Those on white paper are to send to other museums, preserve as records, and for use in making up the catalogues which will eventually be published.

(Ed.: Specimens were here exhibited of cards and photographs taken from specimens already on exhibition in the Museum.)

Cards are now being attached to the specimens already out, and a plan is under way to collect all the ethnological material not yet installed in one large store-room, where it is to be systematically classified. The incoming collections can be distributed according to the plan adopted, and duplicates can be selected before this temporary storage. This plan will greatly facilitate the routine work.

Greater progress has not been made in installing and describing the specimens and collections for many reasons, but principally on account of the various exhibits prepared at the Museum. which have diverted a large part of the force from the regular work, and besides this experiments are being made as to cases and styles of mounting

general and special exhibits. Moreover the force employed is not very large, but when the Fish Exhibit is permanently installed there will be more men available for the routine work.

Recently published criticisms on the classification and method of arrangement now provisionally adopted in the Museum have shown to a certain extent that there is a misunderstanding as to just how far the Museum is committed to any definite plan. The adopted unit box, in which specimens from the same locality are mounted for exhibition, enables a provisional classification to be adopted. The boxes slide in and out of the cases, and the whole character of the present arrangement can be altered and radically changed in a day. By putting only a few specimens in each box, room is left for future collections supplemental to those now installed.

Classification and method of installation depend upon various considerations. The material on hand determines the former, and experiment and trial the latter. Without going at all into the subject of Museum classifications in general, or into the *future* arrangement of the National Museum, it seems that every immediate consideration demands something like the present one, however much it may be understood or misunderstood from the published bulletins to that effect.

The broad aim of the present plan is a teleologic classification, one by *use* rather than by morphology. The comparative method has been adopted in preference to the ethnographic because it is demanded by the nature of the material on hand, and to a certain extent better suited to the American mental habit of analysis and comparison. I will try and illustrate these points by special examples.

For a few tribes and regions an ethnographical arrangement would answer admirably, viz., the *Eskimos*, *Zuñians*, *Moquis*, *Haidahs*, *Makahs*, and our *Western* and *Alaska* Indians, but such a general plan would be absurd and but show up the meagerness of our collections from every other region. Picture Corea with two small trays of stuff that can but be vaguely referred to it, Africa with three, and South America with only several cases! Even our Japanese, Chinese, and Indian collections would hardly admit of such an arrangement. Should Congress become suddenly liberal and place a fund at the disposition of the Museum to enable it to send out intelligent collectors well informed as to the Museum's wants it would doubtless occur in the course of time that an ethnographic

arrangement would be demanded as the only natural one (supplemented of course by occasional and separate comparative collections.) With the miscellaneous collections that are likely to come in, however, unless Congress does make special appropriations, the present arrangement is likely to be found the best one. A thorough and exhaustive ethnographic collection would show each product of a country's civilization in the different stages of its evolution and development, but with a miscellaneous and scattered collection we must draw on various countries to illustrate this development.

A recent article on museum classification says "The comparative method necessarily cuts across the natural order of things in their relations to time; and this is an obvious defect, which, when applied to anthropological collections, is destructive of all natural conceptions as to the way in which modifications and changes really arise or flow out of pre-existing, localized, or racial conditions." It seems to me, as far as I may express any opinion on the subject, that the question tends to settle itself thus.

With exhaustive collections from representative tribes and with sufficient funds to fill out or supplement the collections the ethnographic plan is the most desirable one.

With scattered and miscellaneous collections the comparative method makes the best use of the material.

The Museum plan is an improvement on each of the above, as it combines the advantages of both. The classification provisionally adopted is a teleologic one, subject to special modifications to suit special cases. To illustrate this:

In the Museum there is a collection of pipes from all parts of the world. The Haidah carved black slate pipe stands out as unique, and it might seem that the fault in this comparative method of arrangement is that it does not form a fair comparison of the intelligence or artistic tastes and abilities of the various tribes represented. It might be argued that possibly the pipe was the only thing they could carve or do carve. An ethnographic collection from this people would show that they carve equally surprisingly in wood, bone, etc., and have a great deal of artistic taste. The Museum, recognizing this, makes a separate monographic collection and exhibition of Haidah carvings, so we have one or two Haidah pipes in the pipe collection, and, besides this, one or two in a monographic collection of Haidah carvings.

It is aimed in all cases where such arrangement may seem to be

desired to thus draw off certain small ethnographic and monographic collections to call attention to any instructive peculiarities of any tribe or race. It also happens at times that large objects have to be left out of a comparative collection. In fact, any classification must be based on compromise and must yield to exceptions.

As an illustration of how we may show the development or evolution of any object with a widely scattered collection let us take the snow-shoe collection in the Museum. It is mounted on screens in the comparative style. If we had exhaustive collections from any one stock of Indians, say, we might show this development step by step (by the ethnographic method) from the time they borrowed or originated the idea up to its highest development, as shown. With the material at the Museum this evolution can only be suggested, as the steps are very wide, and intermediate ones are not at hand. We must in this adopt Mr. Spencer's plan of illustrating primitive man by our present savage tribe.

DISCUSSION.

Prof. MASON called attention to the advantages derived from a systematic classification and arrangement of the material in great collections like that of the Smithsonian Institution. He also said that an organized effort should be made looking toward a full utilization of the many resources afforded by the various departments of the Government for information valuable to the student of anthropology, and that the attention of the scientific world should be directed to the scope and character of these resources.

Mr. FLINT spoke of the manner in which aboriginal ideas had been followed up and finally developed, illustrating his remarks by showing how a study of the possibilities of the arrow as a projectile had resulted in its use for throwing explosives under a heavy air pressure, for which several patents have already issued.

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EIGHTIETH REGULAR MEETING, March 15, 1884.

Major J. W. POWELL, President, in the Chair.

The Secretary of the Council reported the election of the following-named gentlemen as corresponding members of the Society:

CHARLES C. ABBOTT, Trenton, N. J.
HENRY B. ADAMS, Baltimore, Md.

Rev. JOSEPH ANDERSON, Waterbury, Conn.
Mr. H. H. BANCROFT, San Francisco, Cal.
Mr. AD. F. BANDELIER, San Francisco, Cal.
Dr. DANIEL G. BRINTON, Philadelphia, Pa.
Mr. LUCIEN CARR, Cambridge, Mass.
Mr. JOHN COLLETT, Indianapolis, Indiana.
Mr. A. J. CONANT, St. Louis, Mo.
Dr. GEORGE J. ENGELMANN, St. Louis, Mo.
Prof. BASIL GILDERSLEEVE, Baltimore, Md.
Mr. HORATIO HALE, Clinton, Ontario, Canada.
Prof. G. STANLEY HALL, Baltimore, Md.
Col. H. H. HILDER, St. Louis, Mo.
Dr. C. C. JONES, Augusta, Ga.
Rev. GEORGE A. LEAKIN, Baltimore, Md.
Prof. E. S. MORSE, Salem, Mass.
Prof. RAPHAEL PUMPELLY, Newport, R. I.
Prof. F. W. PUTNAM, Cambridge, Mass.
Col. CHARLES WHITTLESEY, Cleveland, O.
Dr. DANIEL WILSON, Toronto, Canada.

Mr. H. H. BATES read a paper entitled "DISCONTINUITIES IN NATURE'S METHODS," of which the following is a synopsis:

The ingenious analogy drawn by Mr. Babbage, in the ninth Bridgewater treatise, from the operations of his calculating machine, to enforce an argument in favor of the conceivability of miracle, by bringing it under the domain of law, was cited as illustrating some of the discontinuities of evolution, confessedly the result of similar complexities of natural law.

The great discontinuity involved in the passage from inorganic to organic life, which we infer to have taken place under law, but do not understand, was adverted to. Also such apparent discontinuities as the passage from invertebrate to vertebrate life, or the introduction of mammalian life, from lower forms, with the observation that wherever nature seems to have carried specialization to its full extent and to have exhausted the possibilities of structure by mere differentiation she is found to have laid the foundation for a new differentiation, and a new specialization, with higher possibilities, from a different stem low down in the scale, constituting an apparent discontinuity, on account of the obscurity and feebleness and instability of the first unspecialized departures, by which they

were either unobserved or early obliterated through the operation of competition.

Passing over the wide domain of biology, which affords so many instances of this complexity of natural action, illustrations of the same law were sought in the domain of anthropology. The advent of man, and his means of progress, affords such examples. The development of the inventive faculty, as the distinguishing characteristic of mind, caused a modification of the old plan of progress by natural selection. Instead of being himself modified by nature, as hitherto, man began to act upon nature, both organic and inorganic, and to modify it to his needs, as Mr. Ward has pointed out. Henceforth natural selection affected only mental and ethnic qualities, through modification of nervous structure. Physical modification ceased to any important extent. Instead of developing weapons, man constructed extraneous ones for his use. With these he conquered competition and removed the rivals most cognate to himself. Militarism ensued, and resulted in high specialization.

Differentiation, however, soon reaches its highest results in this direction, and obstructs further progress. An apparent discontinuity occurred in the rise of industrialism out of the humbler elements of society, through the germination of inventions, beginning with the rediscovery of gunpowder, which was the commencement of the downfall of militarism. The tool-making and tool-using faculty came into prominence. Peaceful arts began to flourish, man s condition became ameliorated, and a new progress supervened. The new direction of evolutionary development was adverted to. Man, having ceased to evolve by physical selection, evolves by extraneous organs. Weapons and tools were the beginning of these, but he has also now enormously developed his means of locomotion, as well as his organs of special sense and expression. His eye is reinforced by the telescope and microscope and any optical device he needs; his ear by the telephone. The products of artistic industry furnish him with means for unlimited gratification of the æsthetic faculty in decoration. The culinary art relieves him from some of the burdens of digestion and increases his range of nutriment. All these extraneous means constitute a departure from the old law of development of the individual by selection.

Moral and ethical development have not made a parallel advance

since the dawn of history, on account of the lack hitherto of any discovery in that field commensurate with the important discoveries which modified his intellectual progress. Such a discovery would afford, by its results, an instance of a true and beneficent discontinuity. The necessity has always been recognized, and many theories broached which accomplished great temporary results, but failed of permanent fruit for want of confirmation.

The operation of discontinuities in the complex law of evolution is not always or necessarily beneficent. Nature is not optimistic, and discontinuties are known to have occurred which were disastrous and retrograde, as geological history evinces. Dissolution is involved in evolution.

DISCUSSION.

Mr. LESTER F. WARD said that he welcomed the term "discontinuity" in this new sense as supplying a need in biology. Its old use to denote actual breaks in the series and the special creation and fixity of species was no longer believed to express a scientific truth. But a special term was needed to designate certain apparent breaks which occur at irregular intervals both in the development of life and of society. Among these he enumerated the origin of life through the introduction of the substance protoplasm, the comparatively abrupt appearance of vertebrated animals which seem to have been developed from one of the lowest forms of invertebrate life, the equally radical change which resulted in the mammalian type, and the remarkable "short cut" by which man was reached through the lemurian and simian stem, leaving the other great branches, the *carnivora*, *ungulata*, etc., entirely out of his path. He had, in a paper read at a previous meeting, laid special stress upon the similarly sudden introduction of the developed brain of man, with its momentous consequences, as the first and greatest of this series of anthropic and sociologic strides to which Mr. Bates' paper was chiefly devoted.

In reply to remarks by Dr. Welling and Prof. Thomas inquiring how this kind of discontinuity was to be distinguished from the actual breaks postulated by the old school of biologists, Mr. Ward said that the reconciliation was effected through a recognition of the now well-established law of the ephemeral character of transition forms. The variations of structure which are destined to result in the dominant type take place at a point low down in the

scale. The first modified forms are few and feeble and leave no permanent record of their existence. The modifications required to give them a firm foothold take place with rapidity and the intermediate gradations are lost. The first evidence the investigator has that a new departure has taken place is the appearance of the more or less completely modified type, and it seems as though there had been a fresh act of creation, or *saltus*.

President WELLING said he would like to have Mr. Bates explain the precise sense in which he used the term "discontinuity" before conceding its necessity as an addition to scientific nomenclature. Without such explanation it would perhaps be held by many that the facts and principles recited in the essay were sufficiently covered by that law of succession, differentiation, and integration which the reflective mind of man had spelled out from the ongoings of nature. In these ongoings there had been constant *discontinuations* as well of processes as of products, but no *discontinuity*. If any actual discontinuity must be admitted then the whole doctrine of evolution, as commonly conceived, must fall to the ground, for that doctrine proceeds on the assumption of perpetual continuity amid perpetual discontinuations in natural processes. These perpetual discontinuations do but mark out the line of continuity along which nature has worked in the normal movement and projection of her processes and products. Discontinuations are matters of fact, but the principle which colligates them is *continuity*, not *discontinuity*.

In illustration of this point of view Mr. Welling then cited that latest and most stupendous evolution of man in society, known as international law. This law was built on the perpetual discontinuation of customs, practices, and institutions dating from the most primitive forms of social organization down to the present time, but none the less had it been built without the slightest lesion of continuity in the process of its evolution, for each successive differentiation in social and national relations had only paved the way for a new integration in thought and action.

Prof. THOMAS said that he agreed with Mr. Bates and Prof. Ward in believing that the term "discontinuity" was properly applied in speaking of some of the processes of nature. In following up the line of progress in the development of animal life we observed branches shooting out on either hand. For illustration, in passing from the higher Annuloida, Huxley's Scolecida, we are led by one

line, the Annulosa, to the Arthropoda, culminating in the higher insects. Here this branch appears to cease and is wholly separated from any of the higher forms of animal life. Here Prof. Thomas believed was a true discontinuity.

On the other hand, starting near the same point, was another branch embracing the mollusca.

The great vertebrate line, instead of originating from any of the higher forms of either of these branches, was supposed to arise directly or through a few transitional forms out of the Tunicata, the ascidian form.

There are many diverging branches, and as it appeared to be a law that no diverging line ever returned to the main stem or coalesced with another there must be discontinuities. No evolutionist can admit that there are any absolute gaps or breaks in the line of development, as this would be fatal to his theory. The line must be continous or the theory must fall to the ground.

Mr. MASON said that phenomena might be associated in such groups as to be habitually observed together. Now, the mind being turned for a while toward one part of a group, returns to find a great change. There has been a discontinuity. Let us further illustrate. If we were studying Indian pottery, we should want to investigate the material, the implements, the agent, the process, the finished product, and the design, or final cause. Here are six sets of entirely different observations, the discontinuance of any one of which would produce an apparent discontinuity in the final result. The material might give out; it might be replaced by other material; new tools might be invented or imparted. The change of social order might throw the industry into other hands, as for instance, potters might become men instead of women The introduction of varied processes, the multiplication of functions by the increase of wants would bring about the same result. The disconnections are apparent therefore, they are not real. In short, discontinuity anywhere either in natural or social phenomena is impossible.

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EIGHTY-FIRST REGULAR MEETING, April 1, 1884.

Dr. ROBERT FLETCHER, Vice-President, in the Chair.

The Secretary of the Council announced the election of the following members:

Prince Roland Bonaparte, St. Cloud, France; Prof. A. Poniatovsky, Sec. Imperial Russian Archæol. Soc., St. Petersburg; Dr. Enrico Giglioli, V.-Pres., Anthropological Soc., Florence, Italy; Prof. Johannes Ranke, Editor Correspondenz-Blatt, German Anthropological Soc., and Sec. Anthropological Soc., Munich.

A paper entitled "RECENT INDIAN GRAVES IN KANSAS," prepared by Dr. ALTON H. THOMPSON, of Topeka, Kansas, was read by Colonel SEELY.

ABSTRACT.

The writer in 1879 assisted in the examination of four graves in an old burial ground connected with the mission to the Pottawotomies, six miles west of Topeka. The ground appears to have been the site of a former Indian village, believed by some to have been occupied by Crows. Careful inquiry, however, makes the identity of these people with that tribe very doubtful. Three of the graves were accurately oriented, the fourth being much inclined, as if made when the sun was at its northern limit. Besides the bones the first grave yielded quite a number of metal ornaments, consisting of disks of rolled silver with stamped perforations and incised ornamentation, small silver buckles, and pieces of chains like cheap brass watch-chains, all evidently of white manufacture. The traders say that it was formerly common to receive designs from the Indians, from which ornaments were made and furnished to those who had ordered them. Sometimes they also procured sheets of brass and silver, which they worked according to their fancy. Silver coins, particularly the old Spanish dollars, were often beaten out by the Indians into disks, and ornamented.

The condition of the remains in the first grave indicated it to be much more ancient than the others. No trace of clothing or of any enclosure for the body appeared. In the second, a fracture in the skull showed that the person had probably met death by violence.

The body had been enclosed in a hollow log or in bark. In this, and in the third and fourth graves, leather leggins, blankets of white manufacture, and a silk handkerchief were found, all much decomposed.

The skulls were all of true Indian type. The writer proposes to continue his researches in this interesting locality.

DISCUSSION.

Prof. THOMAS said that the paper was valuable as tending to throw light on the subject of intrusive burial and mentioned in connection therewith some recent finds in Wisconsin.

Mr. PROUDFET said that he had obtained from an Indian grave in Southwestern Iowa silver disks similar to those mentioned by Dr. Thompson.

Dr. FLETCHER, referring to the flattening noticed in certain skulls exhumed by Dr. Thompson, expressed the belief that such condition was probably not due to pressure in burial.

Colonel SEELY said that from what we now know it is evident that the savage was far more than a straggler in the wilderness. The remains of various ritualistic systems suggests a more elaborate conception in such matters than is consistent with notions previously entertained concerning the savage state. As illustrating this line of inquiry Col. Seely read an extract from the Gippsland Mercury, for January, 1884, giving an account of certain aboriginal ceremonies witnessed by A. W. Howitt on the occasion of admission of the youths of the Kurnai tribe to the dignity of manhood.

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EIGHTY-SECOND REGULAR MEETING, April 15, 1884.

Major J. W. POWELL, President, in the Chair.

The Curator reported the following gift: Final report of the Anthropometric Committee of the British Association.

A vote of thanks was passed to the donors.

Dr. J. M. GREGORY read a paper on the "ELEMENTS OF MODERN CIVILIZATION."

Civilization is the supreme fact in sociology. It is the comprehensive name of all that marks progress and well-being in society and states. It is also the highest criterion by which to test the value of social institutions. Whatever promotes civilization we pronounce good and useful; whatever abases or destroys it is bad.

What is civilization? What are the essential elements of which it is composed, and by which it may be described? These are questions which confront the student of sociology at the outset of his studies.

To answer these questions properly drives us to a deeper analysis; it raises the profounder question, Is civilization external or internal? Is it in the man, or in his surroundings? In the general way, most of us will admit that it is in the man—in man and in society.

Settling down then upon the clear truth that civilization is essentially internal, that it is of the mental man, though working outwardly into necessary forms and movements, another question starts up to confront us. This question is as to the proper method and direction of our search. Shall we call to our aid our own conscious experience, and look to find what there is in man that impels him to outward action; or shall we neglect the mental forces and direct our study to external facts to ascertain their character, classes, and connections?

If we decide to confine our quest to the material and visible facts of social life, shall it be to the present or the past; shall we grope among the fossil remains of a paleozoic sociology, or shall we seek to analzye the phenomena of a living sociology?

No science can dispense with the study of the past, and all true students must acknowledge the usefulness as well as the curious interest which attaches to the discoveries of the archæologist and paleontologist, but Herbert Spencer says "it is hopeless to trace back the external factors of social phenomena to anything like their first forms."

We may without debate accept the doctrine of an evolution in civilization. All history implies development, or evolution, if the term is preferred. It exhibits the emergence of the new out of the old, the complex from the simple, the tribe from the family, the nation from the tribe, the civilized from the savage. But the evolution of society is not, as some represent it, a mere physical or biotic evolution. It is anthropic, and more, it is spiritual and volitional. Human passions, intellections, and volitions must be admitted as evolving forces.

The under estimate of the value of consciousness as a source of definite knowledge, and the over estimate of the value of the archaic and savage social forms are both serious mistakes of social science.

History rises out of the physical and the mechanical, and becomes human only by the introduction of the human intelligence among its causes and forces; and to refuse the aid of consciousness in the study and interpretation of history is to place it among the physical

sciences of geology and astronomy, or at best to rank it with the biological studies of botany and geology. Some have already taken this ground, driven, as they affirm, by the stern logic of observed facts. Sentient being appears to them as one of the phases of evolution of physical nature, and subject to the same laws as other physical phenomena. Such a theory may seem delightfully simple, but it is fearfully suicidal, since it hopelessly invalidates all the acts of thought and intelligence by which this or any other truth can be known.

Doubtless sociology and civilization have their laws of evolution as potential if not also as clear as those of the physical sciences; and these laws may be studied in the savage and archaic stages of society as well as in the more recent and more complex. Sometimes a law will be seen even more clearly in the earlier and simpler stages of evolution; but the higher evolution ordinarily involves forms and functions wholly unknown to the lower; and the complex modern civilization exhibits classes of phenomena of which the savage gives no hint or promise, or gives it only in so rudimental a form as to be unrecognizable, except in the light of fuller development.

If now, we accept the conclusions that civilization is essentially internal, that its external phenomena are the necessary outcome of the nature of man and of society; if we further agree that our study of civilization must begin with it as it exists, here and now; if we accept as a guiding truth that there is nothing in the essential nature and attributes of man which does not find its expression in history, and that there is nothing essential in history which does not find its root and explanation in the nature of man, then our search for the elements of civilization narrows its field to a study of those common and universal principles, or instinctive activities, in the human being which work outwardly into the facts and usages of society, meeting and modified as they must be by environment; or, to state the same thing objectively, it is to select, classify, and study all common universal social phenomena in the light of our conscious instincts, needs, and activities. In physics we ascend from effects to causes; from phenomena to forces; in sociology the cause is a conscious one and we may safely descend from force to phenomena.

Our method being explained and defended, we march to results.

## I.

The commonest fact of human consciousness is the existence of the vital wants, hunger, thirst, and the desire of proper warmth. These act as a steady force compelling men to the efforts to secure their gratification. Out of these powerful and persistent appetites, spring through the slow round of the ages, what we call the useful arts, the food-producing, the cloth or clothes-making and the building arts; and ancillary to these, the arts of the tool-maker and machinist, and of those who collect, prepare or transport materials for the others. As the satisfaction of these wants is the vital condition of human existence, so these arts are the broadest fundamental element of external civilization. They uphold and help on all the others; and their advancement at once measures and promotes the social progress of which they are most prominent factors.

The vital wants of mankind are at first merely animal, and are as simple as they are savage; but they steadily multiply, diversify, and refine with every advance in man's intellectual and social development, till they mingle and interlock with all the higher desires and artistic tastes of civilized men. Keeping pace with these, the rude efforts, scarcely to be called arts, which supply the low needs of the wild man, divide and differentiate into all the innumerable industries of the highest sociologic condition. Thus the craving of a present hunger which drives the savage to the chase widens out into the prudent care for all future hungers, and the food-producing arts grow with the variations of soil and climate into the enormous reach of agricultural industries and the hundred commercial, manufacturing, chemic, and cooking arts till farms, forests, orchards, gardens, and breeding waters, with mills, and manufactories, cover the continents with their costly array to satisfy the needs of civilized society.

So also the shivering desire for shelter and clothing which the savage satisfies with the tanned skin of his game, and with the cave, hut, wigwam or tent, grows into that broad economy with builds houses, palaces, and cities, and evolves the great family of building arts which occupy and enrich so many thousands of mankind.

But however vast and varied these useful arts they all look back to the vital wants as their source and spring; and as these wants are persistent, and press always with resistless force, the resulting phenomena must constitute a universal and essential element in all civilizations.

## II.

Next the vital wants, as a sociologic force, may be counted the group of social instincts. The sexual appetite which perpetuates the race and furnishes the basis of the family, the most natural and most persistent form of social organization, stands foremost of these, but it does not stand alone. Working with it is the love of offspring, and next to this comes that desire of companionship which we may call the social instinct proper.

To the student of modern civilization it matters little by what long evolutions these instincts gathered their present form and force; they impel men to live in communities and support the complex structure of society. Acting among men in the savage state, they gather them into tribes with scarcely more of organization than the cattle that feed in herds or the birds that fly in flocks. But developing with the advance of mankind in intelligence, by a process similar to that noticed in the useful arts, they finally produce highly organized society and states, with all their array of social and political interests and institutions.

The social instinct is strengthened as men find that society affords additional safety against enemies and widens the field of their arts and co-operations. Self-interest acts in the same direction as the social feeling and doubles its effects; but we may doubt whether these selfish advantages of safety and profit sufficiently account for the existence and power of the social instinct.

I have grouped together the three facts of the sexual, the parental, and the proper social desires; but each of these gives also its own peculiar results in our civilization. Out of the sexual desire grow all marriage institutions, and as the human species seem naturally to associate in pairs, all abnormal institutions, like polygamy and polyandrya, must result not from natural instinct but from some necessities of savage society. The strong feeling in favor of the monogamous family shows that the native disposition of mankind is towards pairs and not towards herds.

The sexual instinct would give simply a married pair; the offspring instinct builds the permanent family. The love of offspring is a sort of extension of self-love—the widening and perpetuation of name and of personal power and possessions. It thus tends to the creation of aristocracies and dynasties.

The social instinct added causes the family to become persistent

and widens it out into the patriarchate and tribe—the earliest and simplest forms of political society.

Victor Cousin puts the sense of justice as the foundation principle of the state; but justice is simply regulative, and serves only for the organization and maintenance of a society already existent. It builds a government to protect those whom the social instincts have drawn together.

III.

Next to the vital wants, proceeding in the natural order, should come, perhaps, the æsthetic tastes—the love of the beautiful and of whatever inspires the higher emotions. The universality of the æsthetic feeling is proved by the fact that it is found in early childhood and among savages as well as among the mature and the civilized. Out of these tastes come the fine and decorative arts, sculpture, painting, architecture, landscape gardening, music and poetry, and all the ornamentation of dress or abode, with the graceful forms and bright coloring which men give to the commonest implements of life. Public amusements, in nearly all their forms, are but an appeal to some æsthetic principle, and what are known as the refinements of civilization are but applications of the same principle. As an element of civilization it is constant and often commanding, giving its chief coloring to some of the most noted civilizations of the world.

IV.

Advancing another step in our search we find in man, as a native instinct, the love of knowledge or love of truth. It is the intellectual appetite. It is shown in the tireless curiosity of childhood and savages, and in the universal tendency of mankind to seek the causes of phenomena.

Out of this intellectual appetite springs another group of facts in civilization—such as science, philosophy, literature, education, and language itself.

Whatever may have been the genesis of this power of thought, or the steps in its evolution, it is one of the largest forces in civilization, and it rises by a natural gravitation to the summit and dominates and directs all others. It is by the aid of his intelligence that man emerges from savagery, and achieves civilization. With the birth of science, all arts, useful and fine, and all institutions, social and political, take on new forms and rise to higher power?

V.

There remains in man another power or instinct which works out historical results, and is one of the elementary forces in civilization. It is the religious nature or faculty—that power within which pushes man to a recognition and worship of the divine. Efforts have been made to find the origin of this feeling in man in the reverence for great men, or in the superstitious fear of the powers of nature; but our inquiry is not with the origin of the faculty. We find it in its full grown state, and gathered around it we find the various institutions of religion, the schemes of faith and of morals, and coming from these, the most important and influential body of usages and opinions known to civilization. Whatever philosophers and men of science may think of this element in civilization, few have the audacity to propose its overthrow without an effort to replace it with some substitute which may give to society the moral support and regulation that religion affords.

This enumeration of the elements of modern civilization is exhaustive. Under one or another of these five fundamental facts all constant phenomena of civilization may be classed. In no civilization are they absent, though they enter into different civilizations not only in different forms but also in different degrees of strength and domination.

Some of the results of these five primal factors become in time prominent forces or factors in civilization. Thus the wealth which comes from the arts becomes in turn a great economic power; and the governments which arise out of the social needs end by becoming social forces of enormous strength. So to the external influences which press upon social growths—the physical environments and the political distributions and organizations to which they give rise, may easily be taken for new and independent factors, they are at most only secondary and modifying forces and not true original elements, at least in the restricted study of civilization as it presents itself in historic time.

DISCUSSION.

Mr. WARD remarked that he had long ago felt the need of a fresh method for the study of social science. The current method dealt with the facts objectively considered, whereas a truly scientific method must discover and recognize the *forces* by which social

phenomena are operated, just as all true physical science concerns itself with physical forces. Perceiving this, he had recognized in the physical desires of the human body the true social forces, and he had formulated the distinction between the true scientific method and that which is commonly pursued as the distinction between the study of society from the standpoint of feeling and its study from the standpoint of function. The current method of studying social science was to study the acts themselves which the desires prompt and their functional consequences; whereas the new and true method would study only the desires themselves as social forces and the direct results accomplished by the individuals thus actuated for the attainment of their satisfaction. The distinction is fundamental—the former method being properly designated as the statical, the latter as the dynamic method.

Mr. WARD had drawn up a system of classification of the social forces according to the dynamic method which he presented, with suitable explanatory remarks, to the Anthropological Section of the American Association for the Advancement of Science at its Boston meeting in 1880, only a brief abstract of which was then published.* The system thus sketched was more fully elaborated and in this form was presented to this Society in a paper read on May 2, and May 16, 1882, and illustrated by charts prepared by Dr. Frank Baker.† As it was then about to be published in permanent form it was not thought advisable to repeat it in the transactions of the Society.‡

Mr. WARD placed on the blackboard the outline of his classification of the social forces and showed that it coincided, with some slight exceptions, entirely with that which Prof. Gregory had presented.

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EIGHTY-THIRD REGULAR MEETING, May 6, 1884.

Dr. ROBERT FLETCHER, Vice-President, in the Chair.

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* Feeling and Function as Factors in Human Development. "Boston Advertiser," Sept. 1, 1880, p. 1; The same more in detail with table of classification. "Science," Oct. 23, 1880, p. 210.

† Transactions of the Anthropological Society of Washington, Vol. II, pp. 11, 12.

‡ See "Dynamic Sociology," New York, 1883, chapters VII and VIII.

Rev. J. Owen Dorsey read a paper entitled, "Migrations of the Siouan Tribes."*

ABSTRACT.

Mr. Dorsey gave a classification of the Siouan tribes, including he Sioux proper, Assiniboin, Ponka, Omaha, Osages, Kansas, Iowas, Otos, Missouris, Winnebagoes, Mandans, Minntarees, Crows, and Tutelos. The general impression seems to have been that this stock moved from the northwest. Mr. Dorsey took an opposing view and traced the tribes from the southeast, up the streams, and from the region of the lakes westward.

DISCUSSION.

Major Powell said that investigations like that of Mr. Dorsey were very valuable—serving to dispel popular myths as to the great number of tribes, and locating ancient villages so that the archæological material could be saved.

Prof. Mason said that he had commenced to work out a synonymy of all the tribes of North America, four years ago, under the patronage of Major Powell. Since then many others had participated in the work, and the whole body of American literature had been ransacked. It was quite possible that many tribal names and references have been overlooked. The members of the society, therefore, would confer a great favor by calling attention to such things occurring in out of the way places.

Dr. E. M. Gallaudet read a paper on "International Ethics."

There were in existence in Europe several societies whose object is to discuss the subject of international relations. The speaker took the ground that the proper basis of these relations should be ethical rather than legal. The law term for *jus gentium* was objected to and the phrase international rights or international ethics suggested. While nations would not listen to absolute commands of law, they have ever shown some willingness to listen to ethical arguments on the justification of their foulest acts by appealing to the verdict of humanity as to the justice of their cause. If publicists should insist that no act of nations should be justified that are not right between individuals, the subject of international law would be

* Printed in American Naturalist, Vol. xix.

settled on a firm basis, and Mirabeau's words, "Le droit est le souverain du monde," would become a fact. The substitution of arbitration for war would advance the reign of right, relieve the burdens of taxation, make commerce free, and establish a brotherhood of nations.

DISCUSSION.

Major POWELL referred to the origin of the term "*jus gentium*," and pointed out the fact that it meant the law found among all nations, rather then international law. While law and rights are nearly synonymous, the history of law developes the difficulty attending the determination of what is right. When that is so found by the majority it then finds expression in law. As the people in a nation find it difficult to ascertain what is justice, so the same obstacle is met in determining international rights. Referring to certain publicists who sought to control the disposition of property pending wars, he said that it was apparent that mankind was becoming more belligerent, and that wars were more destructive of life and property than formerly,

The result, however, of all this was to lessen the number of nations, and with fewer nations, organization with a view to permanent peace became more probable.

Mr. OTIS BIGELOW called attention to an extract taken from "Heber's Travels in India," (vol. 2, p. 28,) as follows:

"The Braijarrees, or carriers of grain, a singular wandering race who pass their whole time in transporting grain from one part of India to the other—seldom on their own account but as agents for more wealthy dealers. They move about in large bodies with their wives and children, dogs and loaded bullocks. The men are all armed as a protection against petty thieves. From the sovereign and armies of Hindustan they have no apprehensions. Even contending armies allow them to pass and repass safely, never taking their goods without purchase or even preventing them if they choose from victualling their enemy's camp. Both sides wisely agree to respect and encourage a branch of industry, the interruption of which might be attended with fatal consequence to either."

EIGHTY-FOURTH REGULAR MEETING, May 20, 1884.

Dr. ROBERT FLETCHER, Vice-President, in the Chair.

The Curator acknowledged the receipt of a series of photographs from Prince Roland Bonaparte, for which the thanks of the Society were voted.

Dr. SWAN M. BURNETT read a paper on "COMPARATIVE FREQUENCY OF CERTAIN EYE DISEASES IN THE WHITE AND THE COLORED RACE IN THE UNITED STATES."

ABSTRACT.

Dr. BURNETT related briefly the history of the manner in which the colored race was suddenly transported from its old to its new environment. Now, physicians have been earnest in the inquiry how much this race has been affected by contact with the superior race. Dr. Burnett himself has made extensive researches on this question at the eye and ear dispensary, and his address was a repetition of his experience, 2,341 cases having been examined—1,530 colored, 1,811 white. The statistics covered inquiries concerning constitutional diseases of the eye, as well as defects in the optical instrument itself. The most marked race difference is in the entire absence of granular lids in the blacks, while it forms quite a large per cent. of eye disease among the whites. In healing power the races are alike.

Dr. ELMER REYNOLDS read a paper on a "COLLECTION OF ANTIQUITIES FROM VENDOME, SENLIS, AND THE CAVE-DWELLINGS OF FRANCE."

Dr. REYNOLDS exhibited a beautiful collection of stone implements sent to him by correspondents in France, and his paper was a narration of his story, reaching through the archæolithic, the neolithic, and the bronze age. The objects were sent by the Count de Maricourt and his brother, the Baron de Maricourt, as types of all the characteristic stone implements in France. Dr. Reynolds reviewed the collection in the light of his own experiences, and showed the method of manufacture and the uses of each.

Mr. WILLIAM H. HOLMES read the following paper on

"EVIDENCES OF THE ANTIQUITY OF MAN ON THE SITE OF THE CITY OF MEXICO."

Aboriginal art in Mexico seems, in a great measure, to have developed and flourished within her own borders, and the story of her culture is, therefore, quite fully recorded in the superficial deposits of the country. The volcanic and lacustrine formations of the elevated valleys and the rich soil of the *Tierra Caliente* teem with relics of many human periods, and the whole surface of the land is dotted with the ruins of temples and cities. Up to this time the efforts of investigators have been confined to the exploration of points of popular interest and in touching, somewhat superficially, upon the more glittering problems. Little attention has been given to classifying and describing the multitude of minor relics. The ceramic art, which was phenomenally developed, has received scarcely more than a passing notice. It is this condition of affairs that affords me an opportunity of presenting this paper, based as it is, upon a brief study of the contents of the soil within the limits of the City of Mexico.

Incomplete as my observations were, they afforded me a most welcome opportunity of beginning the study of the ceramic art of Mexico from the standpoint of actual observation of relics in place. Superb as are the collections within the Mexican Museum, their study is rendered extremely unsatisfactory by the absence of detailed information in regard to their origin and chronology. Fortunately the section of deposits here presented reads with the readiness of an open book, giving not only the proper sequence to its own treasures, but, I doubt not, making clear the relative position of many other relics that would, otherwise, go unclaimed and unclassified.

The site of the capital of the Montezumas is naturally a great repository of the ceramic remains of the pre-Columbian peoples. One has but to wander into almost any of the suburban villages, wherever excavations are going on, to witness the exhumation of multitudes of fragmentary utensils, many of which have been a second and a third time thrown up and rebuilt into the edifices and defences of successive cities.

During the spring of 1884 I spent a few weeks at the Central Railway station, which is located in the outskirts of the city. The old walls and fortifications of the city, dating back perhaps to early

Spanish times, lie just outside of the inclosure of the station, and the road has been cut through these leveled works, and through the accumulated refuse of a small suburban village, now represented by a dilapidated church and a few adobe hovels.

The section exposed by the railway cuttings exhibits a curious agglomeration of the deposits of all past human periods. The remains of previous times and peoples—pottery, stone, and skeletons—have recently been redistributed by the greatest of all innovators, the spade of the Yankee. To those, therefore, who halt only to examine the deposits along the immediate line of the railway there is nothing visible but utter confusion, although a glance is sufficient to show that, in every spadeful, there is evidence of many widely separated stages of art.

Just west of the line, however, and apparently outside of the old line of circumvallation is an area—an acre, more or less—on which an extensive manufactory of adobe bricks has been established. Here excavations have been made exposing the heretofore undisturbed accumulations of past ages to the depth often of eight or ten feet.

The general surface of this area is perhaps from three to four feet below the broad masses of ancient ramparts, and is, at the same time, perceptibly elevated above the level of the lacustrine plain about it. It has been stated by a recent writer, that there is probably no spot remaining about the city of Mexico that shows a trace of pre-Spanish structures, but I am convinced that here we have such a spot. The surface is humpy and uneven, the result probably of comparatively recent ditch-digging or house-building; but there is a gentle arching of the whole area which, taken in connection with the fact that the entire mass is composed very greatly of remnants of aboriginal art, seems to warrant my conclusion. Across one side of this area the old Spanish walls were built and the adobe diggers are now encroaching upon the other. So full is the soil of relics, chiefly of pottery, that the workmen are greatly embarrassed in their labors, even to the depth of many feet, and by the side of each pit is a great heap, composed of fragments too large to be worked into the brick. In one place a section is exposed in a continuous vertical wall nearly a hundred feet long and more than eight feet deep. The upper part bears evidence of more or less disturbance, but the greater part of the exposed deposits have remained absolutely undisturbed since the day of their deposition.

This is made apparent by the very distinctly stratified character of the soil, which consists of dark loam with more or less sand, impurities, and broken relics.

It is difficult to say to what extent the stratification is aqueous, or to what extent the result of periods of unequal artificial accumulation. The fact that the base of the exposed section is several feet lower than the present surface of the lake, suggests the possibility that its waters actually washed the walls of the ancient settlement. The level of the lake has, during historic times, undergone such diverse changes that it cannot be surmised what was its condition at any particular period of the remote past.

The accompanying section, figure 1, although representing but a small part of the horizontal exposure, shows all the important features in their proper relations to one another. It is the result of a number of visits to the spot, most of which were made with the purpose of assuring myself of the accuracy of preceding observations. The deposits of fragmentary pottery reach to the base of the

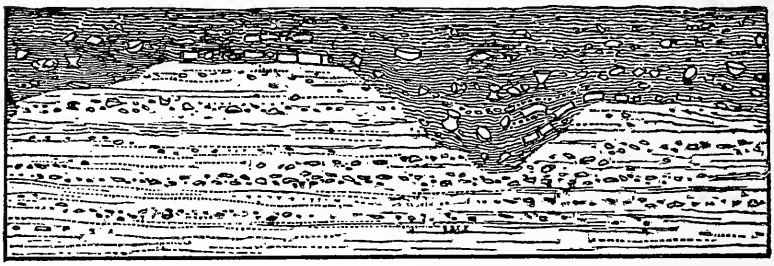

FIG. 1.—Section showing two periods of occupation.

section, and are so arranged as to show beyond a doubt, that they accumulated with the soil and are not subsequent intrusions. This is apparent, not only from their deposition in more or less continuous horizontal layers, as shown in the section, but from the identical character of fragments occurring at corresponding depths.

The prevailing type of ware, throughout the lower part of the section, is very archaic and is to all appearences quite distinct from the handsome pottery characteristic of the upper half of the section.

It was simple in form and rude in finish and little superior in any respect to the rudest products of the wild Indians of North America. At the base the fragments are small and much decayed; higher, they

are larger and better preserved, although I was unable to secure a complete, unbroken vessel.

The only form that came to my notice, although thousands of pieces were examined, is a kind of deep cup or bowl, not unlike our common flower pot, and having a flattish bottom and an extremely uneven and ragged rim. In all cases the exterior surface is covered with impressions of coarse woven fabrics, the single indication of advance toward better finish being a slight polishing of the interior surface, which was accomplished with a smooth implement, such as a pebble or shell. Where well preserved, the paste is generally hard and fine grained, but shows in all cases a rather rough granular fracture. The character of the tempering material cannot be made out, but, in a number of cases, the texture indicates the former presence of fibrous particles like finely pulverized grass, leaves, or straw. The surface is of a pale, yellowish red or terra cotta color, the result of the baking, while the interior of the mass is generally a dark gray.

In Fig. 2, I present an example of this pottery which is restored from fragments. These did not come from the wall of the section, but from a pit, a short distance away, where the pieces were larger

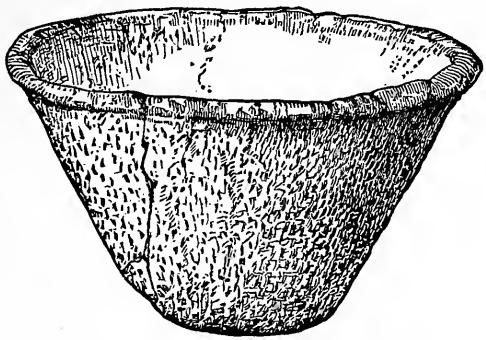

FIG. 2.—Vessel of the most primitive style.

and better preserved. In this example the rim is thick and slightly enlarged as if squeezed over the edge of a basket used as a mold. In most cases no attempt has been made to render the edge even or smooth, and the finger marks and the irregular partings of the margin, which came from squeezing the clay into or over molds and expanding the edges to secure greater size, are all visible.

It is difficult to find a well preserved and clearly defined impres-

sion of the fabric employed in the manufacture of these vessels. The clay was probably not of a character to take a clear impression and the cloth was apparently of a ragged, irregular kind. The mesh was open and the thread coarse and slightly twisted. The finer specimens show about eight intersections to the inch and the coarser probably six. In some cases one series of threads seem to have been large and the other small. These fabrics were applied to the entire exterior surface of the vessel, but not with much regularity. They may have served to facilitate the handling of the ware while in a plastic state.

This pottery is distributed in horizontal layers throughout a vertical series more than six feet in thickness, and represents an early epoch of the art of Anahuac.

In the upper portion of the lower group of beds we encounter two other varieties of ware. These may have been developed from the rude form in the natural course of progress but there are few indications of this growth here. They are much more nearly allied to the later than to the earlier stages of the art of the section. The transition is very abrupt.

As a matter of course I can only present this order of occurrence as characteristic of this locality and of this section. There may be very different combinations in other places, but the order of sequence here indicated is, in the light of history, very suggestive. If the Aztecs, as tradition has it, were the first to settle on this margin of the swampy shore of the lake, then this cord-marked ware is the product of their earliest or savage period, and the finer wares occuring at first so sparingly indicate trade with the more advanced peoples of neighboring settlements.

The variety of ware second to appear in the ascending scale is represented by fragments of large, round-bodied, symmetrical pots or casks, with gently constricted necks and thick rounded recurving rims. The paste is generally reddish upon the surface and gray in the mass, and there is a large percentage of silicious tempering material. The surface, exterior and interior, is painted a dark brownish red and has been evenly polished. Average specimens have been, perhaps, ten inches in diameter and a foot or more in height. The walls are always very thick. Fig. 3, is drawn from fragments sufficiently large to indicate the whole shape clearly. Pottery like this is found imbedded in the adobe bricks of the pyra-

mid of Cholula, and is common in the ancient graves of Costa Rica and New Granada. Large vases recently brought from the province of Chiriqui are identical with these in every respect.

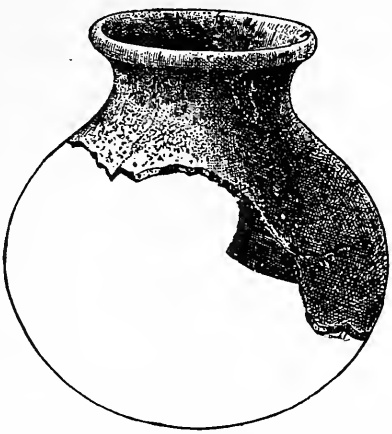

FIG. 3.—Earthern vessel from the lower series of deposits.

Associated with this ware and beginning apparently a little higher in the section, we find the remains of the third variety. The vessels are mostly cup-shaped. They are well made, are simple in treatment, and exhibit a fair degree of symmetry. The prevailing color is a light yellowish terra-cotta tending toward orange. The surfaces are moderately well polished but rarely show attempts at ornamentation. The forms are repeated in the more elaborate wares that succeed it. This ware is identical in most respects with much of that found in the adobe mass of the pyramids of San Juan Teotihuacan, Texcoco, and Cholula, and upon the slopes of the hill of Texcocingo. It is, apparently, the forerunner of some of the more elegant wares of the surface deposits of the section. In the upper part of the lower series of deposits this ware predominates greatly over both the heavy ware and the archaic pottery already described. By reference to the section it will be seen that the surface of the lower series of beds has been much disturbed by the more recent occupants of the site at the beginning of the second epoch. Excavations have been made and afterwards filled up with gradually accumulating refuse, so that a series of imperfect stratified deposits has been spread over all, at first following the curves of the disturbed surface. There is, however, no very

well defined line of separation between the older and newer formations. The distinction is rendered much clearer by the contents of the soil. There are occasional layers of stone and adobe bricks, representing the foundations of houses, as seen in the section. There are great quantities of fragmentary pottery, among which I find many of the artistic shapes and rich decorations characteristic of the surface deposits of Anahuac. Included I find also fragments of the two varieties last described. There are occasional stone implements and great quantities of obsidian knives, hundreds of which are as perfect as when first struck from the core. These are characteristic of the later Aztec period. Near the surface there are fragments of glazed ware indicating Spanish influence. It is not unusual to see in the shallow ditches of the suburban villages, fragments of vessels of aboriginal form and decoration, covered with Spanish glaze. Indeed such vessels can be seen in use by the Indians of to-day and are exposed for sale in the modern markets.

The pottery of the upper division of the section presents great variety of form and ornamentation, but in material and treatment it is extremely uniform. The paste is compact and heavy, and has a moderately even, finely granular fracture. In rare cases the fracture is smooth or conchoidal. The more common wares are lighter and more porous than those of finer finish. The whole mass is often of a pale brick-red color, the baking having been thorough; but more frequently the interior is of a dark blue gray, indicating imperfect firing. The paste is generally hard and the ware has in many cases a sonorous or metallic ring. The walls vary in thickness with the individual vessel. The tempering when distinguishable is always silicious.

The method of finishing the surface is quite uniform although carried to very different degrees of perfection. Occasionally we find a piece without polish; and figurines and elaborately modeled forms are generally quite plain. As a rule the vessels have been very carefully polished. In many examples the markings of the polishing implement are distinctly visible; indeed this is true of the unimportant parts of the majority of vessels of the most perfect finish. The polish of the finer examples is so perfect that it is difficult to believe it the result of purely mechanical processes. The polishing has generally been done after the application of the color and color-designs, but sometimes before. Unpolished surfaces show impressions of the potter's fingers.

There are no indications of the use of a wheel. The vessels are seldom absolutely true in outline, but in a general way are remarkable for symmetry and grace. The colors employed in finishing and decorating are pleasing and often extremely rich. The reds predominate, the whole surface of the simple forms being frequently finished with it. Upon this the designs are painted in black, white, and different tones of red. In the more common utensils the figures are drawn, often carelessly, upon the plain untinted surface. The brush has been handled with freedom and the designs are often quite elaborate. Occasionally we find incised figures and stamped patterns.

The various shapes of vessels obtained at this locality may be classified under a few heads.

First, there are many cups and bowls ranging from a few inches to a foot in diameter, and generally quite shallow. The bottoms are usually flat and the walls expand regularly to the rim. Two examples varying from the rule are given in Figs. 4 and 5. Fig. 4

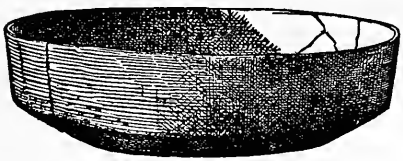

FIG. 4.—Vessel from the upper deposits.

shows a slightly polished, unpainted pan of dark, ochreous tint, with upright sides and flat bottom. The base, outside, is slightly convex next the circumference and concave at the center. It is

FIG. 5.—Vessel from the upper deposits.

eight inches in diameter. Fig. 5 illustrates a deep cup of similar color and finish; a painted design consisting of parallel encircling

lines occupies the exterior surface of the rim. The form is an unusual one in Mexico.

Most of the vessels obtained from the upper stratum are neatly finished and tastefully decorated. Some are polished like a mirror over the entire surface, exterior and interior. A favorite form is that of a shallow flat-bottomed cup of moderate size, Fig. 6. The designs are greatly varied and are painted in black or in black and white. The white pigment has been applied subsequently to the

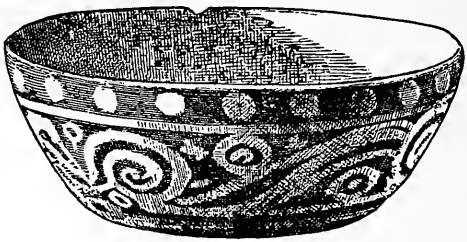

FIG. 6.—Vessel with figures in white upon a red ground, in U. S. National Museum.

polishing of the surface and can be removed with ease. Vessels of this and similar forms are often furnished with tripod supports. One example of the latter variety is given in Fig. 7. The bowls are often very shallow. The designs are simple and occupy the in-

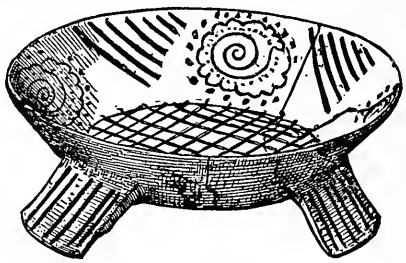

FIG. 7.—Tripod dish with designs in black.

terior surface. A curious device is shown in Fig. 8. The interior surface of the bottom is scoriated with deeply incised reticulated lines, a device probably intended for the grating of food or spices and one still employed by the present inhabitants. A few examples of this general class of ware show stamped decoration. In its manufacture molds were probably used in which intaglio designs had

been executed. Some fragments of cups exhibit figures formed of minute hemispherical nodes. They are further embellished by the

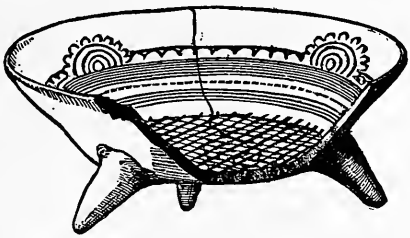

FIG. 8.—Tripod dish with scoriated bottom

addition of sharp conical nodes about the rim. A remarkable feature of these cups is the occurrence of groups of triangular perforations, cut with a sharp tool, and so arranged as to resemble a Maltese cross. These perforations are placed so low on the body as to make the vessel unfit for containing liquids. In the museum of Mexico there are a few examples extensively perforated, leaving about the middle zone of the body only a sort of lattice work of the original walls. The same style of work is elaborately practiced by Oriental peoples.

One large class of vessels resemble an hour-glass in shape. They are really double cups, one end being usually smaller than the other and serving as a foot, but both cups are equally well finished. The exterior surface is highly polished and colored a deep red, and painted with designs in black and white. The fragments are large and very numerous. Fig. 9 illustrates the prevailing form. The

FIG. 9.—Cup with designs in black and white upon a red ground, in Mexican National Museum.

diameter ranges from three to six inches or more. Some of the most beautiful vessels in the Museum are of this general shape.

It is but rarely that one comes upon fragments of the richly colored and highly finished wares characteristictic of the regions of Cholula and of the South. I was fortunate in securing a few small pieces. Two of these are shown in Figs. 10 and 11. Their rarity

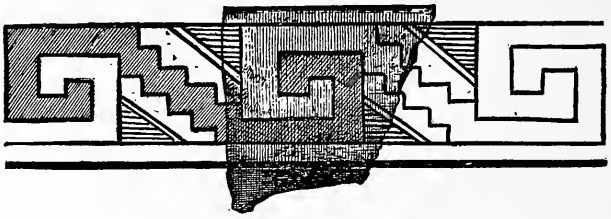

FIG. 10.—Meander design painted in rich colors.

makes it probable that they came to this spot by trade. The first shows a fine strong treatment of the fret and the other of the scroll.

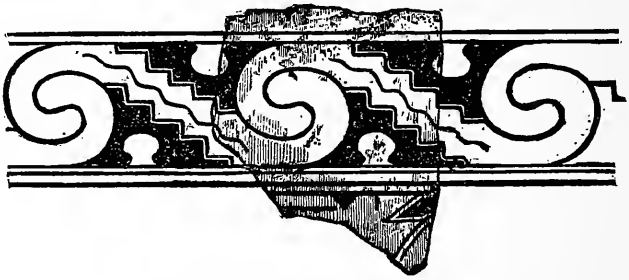

FIG. 11—Scroll ornament painted in rich colors.

These forms are characteristic of the best period of art in both North and South America. The chief charm of this ware is its rich color—an orange ground with figures in red and black, the whole surface being polished like glass.

I found no specimen exhibiting delicate green and pink decorations such as may be seen at San Juan Teotiahuacan, and such as are seen on some of the most beautiful vases in the Mexican Museum.

In the upper series of deposits indicated in the section, I found a fragment of a very remarkable form of vase. It is represented by a number of examples in the Mexican Museum, one of which is

shown in Fig. 12. It has been called a brasier and a censer, and is thought to have been employed in religious ceremonies, but its

FIG. 12.—Ceremonial vase, in Mexican National Museum.

true use is probably unknown. The shape is, however, suggestive of some especial ceremonial office. It resembles a short, upright cylinder, encircled midway by a groove. There are two massive, horizontally-looped handles attached to the sides a little below the middle. The bowl is rather shallow. The lower third of the vessel consists of a hollow foot resembling the bowl above, but open at the sides beneath the handles. The conformation is such that a heavy cord could be passed through the handles and across the doubly cloven foot for suspension as a swinging censer. The exposed surfaces are usually highly polished and the colors embrace black and many rich tones of red.

It should be noted that no traces were found of the dark, highly ornate pottery so often seen in modern times and so frequently brought away by tourists. This ware may have a legitimate place in Aztec art, but does not occur among the ancient productions in any locality visited by me. It is absolutely certain that all the specimens now seen in the shops of Mexico and offered for sale by hawkers on the streets and at the stations—especially at San Juan—are modern products. They are, however, wonderfully well executed, and the appearance of antiquity given them is truly remarkable.

I have, from the pits at the railway station, a number of miscellaneous articles in clay, bits of images of men and animals, whistles, spindle-whorls, and the like. A portion of a curious head found is duplicated in a pipe preserved in the Museum and represented in

FIG. 13.—Pipe with grotesque heads on the bowl, in the Mexican National Museum.

Fig. 13. The whistles are generally of a very simple kind, and the spindle-whorls are not different from those of other parts of Anahuac.

In conclusion, I may recall in a very few words some of the more striking features of this section, calling attention to the order of events suggested by them.

It may be affirmed with certainty that the site of the City of Mexico was at one time occupied by a people in a very primitive stage of art, the remains of which art, so far as found, include nothing but fragments of an extremely rude pottery. There are no traces of tools and no indications of houses. This period of occupancy was a very long one, as it permitted the accumulation in nearly horizontal layers of at least eight feet of finely comminuted refuse.

It is further seen that far along in this period of occupancy new forms of art appeared that do not look like the work of the proper occupants of the site produced by gradual improvement, but rather like intrusive products acquired by exchange or otherwise from more cultured tribes. Again, at the end of this first period there is a horizon, pretty well-marked, above which primitive forms of art do not appear.

Near the base of the deposits of the second period foundations of houses are discovered in which rubble, squared stones, and adobe bricks have been used. In this part of the section we find stone implements and ceramic products of a very high order of merit. With these, and especially near the surface, there is a layer abounding in obsidian implements. This marks the last and culminating stage of Aztec art, ending in the historic period proper.

Speculation upon the period of time represented by this section would be useless, and an attempt to correlate the events recorded with those shadowed forth in tradition would be equally vain. The earliest period is probably beyond the ken of tradition, and the last marks the historic period of Aztec occupation.

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SPECIAL SESSION, October 11, 1884.

In accordance with a call of the Council, the Society met in special session at Columbian University Hall, for the purpose of listening to an address from Prof. E. B. TYLOR, of Oxford University, England.

Through invitation extended by order of the council there were also present members of the Philosophical and Biological Societies, of the Cosmos Club, as well as officers, professors and students of Columbian University.

The Society was called to order by President POWELL, who in a few words introduced the speaker, who delivered the following address on—

"HOW THE PROBLEMS OF AMERICAN ANTHROPOLOGY PRESENT THEMSELVES TO THE ENGLISH MIND."

I have seldom, ladies and gentlemen, felt myself in a more difficult position than I do at this moment. Yesterday morning, when we returned from an expedition out into the far west—an expedition which your President was to have joined, but which, to our, great regret, he was obliged to give up—I heard that at this meeting of the Anthropological Society of Washington I should be called upon to make, not merely a five-minutes' speech, but a subtantial address; and since that time my mind has been almost entirely full of the new things that I have been seeing and hearing in the domain of anthropology in this city. I have been seeing the working of that unexampled institution, the Bureau of Ethnology, and studying the collections which, in connection with the Smithsonian Institution, have been brought in from the most distant quarters of the continent; and, after that, in odd moments, I have turned it over in my mind, what can I possibly say to the Anthropological Society when

I am called upon to face them at thirty-six hours' notice? I will not apologize; I will do the best I can.

I quite understand that Major Powell, who is a man who generally has a good reason for everything that he does, had a good reason for desiring that an anthropologist from England should say something as to the present state of the new and growing science in England as compared with its condition in America—for believing that some communication would be acceptable between the old country and the new upon a subject where the inhabitants of both have so much interest in common, and can render to one another so much service in the direction of their work. And therefore I take it that I am to say before you this evening, without elaborate oratory and without even careful language, how the problems of American anthropology present themselves to the English mind.

Now, one of the things that has struck me most in America, from the anthropological point of view, is a certain element of old-fashionedness. I mean old-fashionedness in the strictest sense of the word—an old-fashionedness which goes back to the time of the colonization of America. Since the Stuart time, though America, on the whole, has become a country of most rapid progress in development, as compared with other districts of the world, there has prevailed in certain parts of it a conservatism of even an intense character. In districts of the older States, away from the centres of population, things that are old-fashioned to modern Europe have held their own with a tenacity somewhat surprising. If I ever become possessed of a spinning-wheel, an article of furniture now scarce in England, I can hardly get a specimen better than in Pennsylvania, where "my great-grandmother's spining-wheel" is shown—standing, perhaps, in the lumber-room, perhaps in an ornamental place in the drawing-room—oftener than in any other country that I ever visitied.

In another respect Pennsylvania has shown itself to me fruitful of old-fashioned products. I was brought up among the Quakers—like so many, I dare say, who are present; for the number of times in the week, or even in the day in which it occurs that those whom one meets prove to be at least of Quaker descent, represents a proportion which must be highly pleasant to the Quaker mind. In the history of the Society of the Friends there has recently come out a fact unknown, especially to the Friends themselves. Their opinion has always been that they came into existence in the neigh-

borhood of 1600, by spontaneous generation, in an outburst of spiritual development in England. It has now been shown, especially by the researches of Robert Barclay (not the old controversialist, but a modern historian,) that the Quakers were by no means the absolutely independent creation that they and others had supposed them to be; that they were derived from earlier existing denominations by a process which is strictly that of development. Their especial ancestors, so to speak, were a division of the early Dutch sect known as Mennonites. The Friends have undergone much modification as to theological doctrine; but some of their most pronounced characteristics, such as the objection to war an oaths, and even details of costume, and the silent grace before meals, remain as proofs of Mennonite derivation. To find the Mennonites least changed from their original condition is now less easy in their old homes in Europe than in their adopted homes in the United States and Canada, whither they have migrated from time to time up till quite recently in order to avoid being compelled to serve as soldiers. They have long been a large and prosperous body back in Pennsylvania. I went to see them; and they are a very striking instance of permanency of institutions, where an institution or a state of society can get into prosperous conditions in a secluded place, cut off from easy access of the world. Among them are those who dissent from modern alteration and changes by a fixed and unalterable resolution that they will not wear buttons, but will fasten their coats with hooks and eyes, as their forefathers did. And in this way they show with what tenacity custom holds when it has become matter of scrupple and religious sanction. Others have conformed more and more to the world; and most of these whom I have seen were gradually conforming in their dress and habits, and showing symptons of melting into the general population. But, in the mean time, America does offer the spectacle of a phase of religious life, which, though dwindling away in the old world region where it arose, is quite well preserved in this newer country, for the edification of students of culture. These people, who show such plain traces of connection with the historical Anabaptists that they may be taken as their living representatives, still commemorate in their hymns their martyrs who fell in Switzerland for the Anabaptist faith. There was given me only a few days ago a copy of an old, scarce hymn-book, anterior to 1600, but still in use, in which is a hymn commemorative of the martyr Haslibach, beheaded for refusing to

conform to the state religion, whose head laughed when it was cut off.

Now, to find thus, in a secluded district, an old state of society resisting for a time the modifying influences which have already changed the world around, is no exceptional state of things. It shows the very processes of resisted but eventually prevailing alteration which anthropologists have to study over larger regions of space and time in the general development of the world. In visiting my Mennonite friends in Pennsylvania, I sometimes noticed that while they thought it nothing strange that I should come to study them and their history, yet when I was asked where I was going next, and confessed with some modesty that I was going with Major Powell to the far west to see the Zuñis, this confession on my part was received with a look of amazement, not quite unmingled with kindly reproof; it seemed so strange to my friends that any person travelling about of his own will should deliberately go to look at Indians. I found it hard to refrain from pointing out that, after all, there is a community of purpose between studies of the course of civilization whether carried out among the colonists of Pennsylvania or among the Indians of New Mexico. Investigation of the lower races is made more obscure and difficult through the absence of the guidance of written history, but the principle is the same.

A glance at the tribes whom Professor Mosely and I have seen in the far west during the last few weeks has shown one or two results which may be worth stating; and one, merely parenthetical, I think I must take leave to mention, though it lies outside the main current of my subject.

Our look at North American Indians, of whom it has been my lot to write a good deal upon second-hand evidence, had, I am glad to say, a very encouraging effect; because it showed that on the whole much of the writings of old travelers and missionaries have to be criticised, yet if, when carefully compared, they agree in a statement, personal inspection will generally verify that statement. One result of our visit has been, not a diminution, but an increase of the confidence with which both of us in future will receive the statements of travelers among the Indians, allowing for their often being based upon superficial observation. So long as we confine ourselves to things which the traveler says he saw and heard, we are, I believe, upon very solid ground.

To turn to our actual experiences. The things that one sees

among the Indian tribes who have not become so "white" as the Algonkins and the Iroquois, but who present a more genuine picture of old American life, do often, and in the most vivid way, present traces of the same phenomena with which one is so familiar in old-world life. Imagine us sitting in a house just inside California, engaged in what appeared to be a fruitless endeavor on the part of Professor Mosely to obtain a lock of hair of a Mojave to add to his collection. The man objected utterly. He shook his head. When pressed, he gesticulated and talked. No; if he gave up that bit of hair, he would become deaf, dumb, grow mad; and, when the medicine man came to drive away the malady, it would be of no use, he would have to die. Now, all this represents a perfectly old-world group of ideas. If you tried to get a lock of hair in Italy or Spain, you might be met with precisely the same resistance; and you would find that the reason would be absolutely the same as that which the Mojave expressed,—that by means of that lock of hair one can be bewitched, the consequence being disease. And within the civilized world the old philosophy which accounts for disease in general as the intrusion of a malignant spirit still largely remains; and the exorcising such a demon is practised by white men as a religious rite, even including the act of exsufflating it, or blowing it away, which our Mojave Indian illustrated by the gesture of blowing away an imaginary spirit, and which is well known as forming a part of the religious rites of both the Greek and Roman church. How is it that such correspondence with old-world ceremonies should be found among a tribe like the Mojaves, apparently Mongolian people, though separated geographically from the Mongolians of Asia? Why does the civilization, the general state of culture, of the world, present throughout the whole range, in time and space, phenomena so wonderfully similar and uniform? This question is easy to ask; but it is the question which, in a few words, presents the problem which, to all anthropologists who occupy themselves with the history of culture, is a problem full of the most extreme difficulty, upon which they will have for years to work, collecting and classifying facts, in the hope that at some time the lucky touch will be made which will disclose the answer. At present there is none of an absolute character. There is no day in my life when I am able to occupy myself with anthropological work, in which my mind does not swing like a pendulum between the two great possible answers to this question. Have the descendants of a

small group of mankind gone on teaching their children the same set of ideas, carrying them on from generation to generation, from age to age, so that when they are found in distant regions, among tribes which have become different even in bodily formation, they represent the long-inherited traditions of a common ancestry? Or is it that all over the world, man, being substantially similar in mind, has again and again, under similar circumstances of life, developed similar groups of ideas and customs? I cannot, I think, use the opportunity of standing at this table more profitably then by insisting, in the strongest manner which I can find words to express, on the fundamental importance of directing attention to this great problem, the solution of which will alone bring the study of civilization into its full development as a science.

Let me put before you two or three cases, from examples which have been brought under my notice within the last few days, as illustrating the ways in which this problem comes before us in all its difficulty.

This morning, being in the museum with Major Powell, Professor Mosely, and Mr. Holmes, looking at the products of Indian life in the far west, my attention was called to certain curious instruments hanging together in a case in which musical instruments are contained. These consisted simply of flat, oblong, or oval pieces of wood, fastened at the end to a thong, so as to be whirled round and round, causing a whirring or roaring noise. The instruments in question came, one from the Ute Indians, and one from the Zuñis. Now, if an Australian, finding himself inspecting the National museum, happened to stand in front of the case in question, he would stop with feelings not only of surprise, but probably of horror; for this is an instrument which to him represents, more intensely than anything else, a sense of mystery attached to his own most important religious ceremonies, especially those of the initiation of youths to the privileges of manhood, where an instrument quite similar in nature is used for the purpose of warning off women and children. If this Australian was from the south, near Bass Strait, his native law is, that, if any woman sees these instruments, she ought immediately to be put to death; and the illustration which he would give is, that, in old times, Tasmania and Australia formed one continent, but that one unlucky day it so happened that certain boys found one of these instruments hidden in the bush, and showed it to their mothers, whereupon the sea burst up through the land in a deluge,

which never entirely subsided, but still remains to separate Van Dieman's Land from Astralia. And, even if a Caffre from South Africa were to visit the collection, his attention would be drawn to the same instruments, and he would be able to tell that in this country they were used for the purpose of making loud sounds, and warning the women from the ceremonies attending the initiation of boys. How different the races and languages of Australia and Africa! yet we have the same use cropping out in connection with the same instrument; and to complete its history, it must be added that there are passages of Greek literature which show pretty plainly that an instrument quite similar was used in the mysteries of Bacchus. The last point is, that it is a toy well known to country-people, both in Germany and in England. Its English name is the "bull-roarer;" and, when the children play with it in the country villages, it is hardly possible (as I know by experience) to distinguish its sound from the bellowing of an angry bull.

In endeavoring to ascertain whether the occurrence of the "bull-roarer," in so many regions is to be explained by historical connection, or by independent development, we have to take into consideration, first, that it is an apparatus so simple as possibly to have been found out many times; next, that its power of emitting a sound audible at a great distance would suggest to Australians and Caffres alike its usefulness at religious ceremonies from which it was desired to exclude certain persons. Then we are led to another argument, into which I will not enter now, as to the question why women are excluded in the most rigid manner from certain ceremonies. But in any event, if we work it out as a mere question of probabilities, the hypothesis of repeated reinvention under like circumstances can hold its own against the hypothesis of historical connection; but which explanation is the true one, or whether both are partly true, I have no sufficient means to decide. Such questions as these being around us in every direction, there are only two or three ways known to me in which at preeent students can attack them with any reasonable prospect of success. May I briefly try to state, not so much by precept as by example, what the working of those methods is by which it is possible, at any rate, to make some encroachments upon the great unsolved problem of anthropology.

One of the ways in which it is possible to deal with such a group of facts may be called the argument from outlandishness. When a circumstance is so uncommon as to excite surprise, and to lead

one to think with wonder why it should have come into existence, and when that thing appears in two different districts, we have more ground for saying that there is a certain historical connection between the two cases of its appearance than in the comparison of more commonplace matters. Only this morning a case in point was brought rather strongly under my notice; not that the facts were unknown, for we have been seeing them for days past at Zuñi. The Indians of the north, and especially the Iroquois, were, as we know, apt to express their ideas by picture-writings, in the detailed study of which Col. Mallery is now engaged. One sign which habitually occurs is the picture of an animal in which a line is drawn from the throat, through the picture of the animal, terminating in the heart. Now, the North American Indians of the lake district have a distinct meaning attached to this peculiar heart-line, which does not attach to ordinary pictures of animals; they mean some animal which is living, and whose life is affected in some way by a charm of some kind.

It is expressly stated by Schoolcraft that a picture he gives of a wolf with such a heart-line means a wolf with a charmed heart. It is very remarkable to find, among the Zuñis, representations of deer and other animals drawn in the same manner; and the natural inference is, that the magic of the Iroquois and the Zuñis is connected, and of more or less common origin. I verified this supposition by asking Mr. Cushing, our authority on Zuñi language and ideas, what idea was generally attached to this well-known symbol; and his answer was, that it indicated a living animal on which magical influence was being exerted. May we not, then, consider—leaving out of the question the point whether the Pueblo people invented the heart-line as a piece of their magic and the nomad tribes of the north picked it up from them, or whether it came down from the northern tribes and was adopted by the southern, or whether both had it from a common source—that, at any rate, there is some ground, upon the score of mere outlandishness, for supposing that such an idea could not occur without there being some educational connection between the two groups of tribes possessing it, and who could hardly have taken it by independent development.

To mention an instance of the opposite kind; I bought a few days ago, amonge the Mojaves, a singular article of dress,—a native woman's girdle, with its long fringe of twisted bark. This or, rather two of these put on so as to form one complete skirt used to

be her only garment; and it is still worn from old custom, but now covered by a petticoat of cotton, generally made of several pocket-handkerchiefs in the piece, bought from the traders. Under these circumstances, it has become useless as a garment, only serving as what I understand is called in the civilized world "a dress-improver;" the effect of which, indeed, the Mojave women perfectly understand, and avail themselves of in the most comic manner. Suppose, now, that we had no record of how this fantastic fashion came into use among them: It has only to be compared with the actual wearing of bark garments in Further Asia and the Pacific Islands in order to tell its own history,—that it is a remnant of the phase of culture where bark is the ordinary material for clothing. But the anthropologist could not be justified in arguing from this bark-wearing that the ancestors of the Mojaves had learned it from Asiatics. Independent development, acting not only where men's minds, but their circumstances, are similar, must be credited with much of the similarity of customs. It is curious that the best illustrations of this do not come from customs which are alike in detail in two places, and so may be accounted for, like the last example, by emigration from one place to another. We find it much easier to deal with practices similar enough to show corresponding workings of the human mind, but also different enough to show separate formation. Only this morning I met with an excellent instance of this. Dr. Yarrow, your authority on the subject of funeral rites, described to me a custom of the Utes of disposing of the bodies of men they feared and hated by putting them under water in streams. After much inquiry, he found that the intention of this proceeding was to prevent their coming back to molest the survivors. Now, there is a passage in an old writer on West Africa where it is related, that, when a man died, his widow would have herself ducked in the river in order to get rid of his ghost, which would be hanging about her, especially if she were one of his most loved wives. Having thus drowned him of, she was free to marry again. Here, then, is the idea that water is impassable to spirits, worked out in different ways in Africa and America, but showing in both the same principle; which, indeed, is manifested by so many peoples in the idea of bridges for the dead to pass real or imaginary streams, from the threads stretched across brooks in Burmah for the souls of friends to cross by, to Catlin's slippery pine-log for the Choctaw dead to pass the dreadful river. In such correspondences of principle we

trace, more clearly than in mere repetition of a custom or belief, the community of human intellect.

But I must not turn these remarks into what, under ordinary circumstances, would be a lecture. I have been compelled to address myself, not so much to the statement in broad terms of general principles, as to points of detail of this kind, because it is almost impossible, in the present state of anthropology, to work by abstract terms; and the best way of elucidating a working-principle is to discuss some actual case. There are now two or three practical points on which I may be allowed to say a few words.

The principle of development in civilization, which represents one side of the great problem I have been speaking of, is now beginning to receive especial cultivation in England. While most museums have been at work, simply collecting objects and implements, the museum of Gen. Pitt-Rivers, now about to be removed from London to Oxford, is entirely devoted to the working out of the development theory on a scale hardly attempted hitherto. In this museum are collected specimens of weapons and implements, so as to ascertain by what steps they may be considered to have arisen among mankind, and to arrange them in consecutive series. Development, however, is not always progress, but may work itself out into lines of degeneration. There are certain states of society in which the going-down of arts and sciences is as inevitable a state of things as progress is in the more fortunate regions in which we live. Anthropologists will watch with the greatest interest what effect this museum of development will have upon their science. Gen. Pitt-Rivers was led into the formation of the remarkable collection in question in an interesting manner. He did not begin life either as an evolutionist or as an anthropologist. He was a soldier. His business, at a particular time of his life, was to serve on a committee on small-arms, appointed to reform the armament of the British army, which at that time was to a great extent only provided with the most untrustworthy of percussion-muskets. He then found that a rifle was an instrument of gradual growth; for the new rifles which it was his duty to inspect had not come into existence at once and independently. When he came to look carefully into the history of his subject, it appeared that some one had improved the lock, then some one the rifling, and then others had made further improvements; and this process had gone on until at last there came into existence a gun, which, thus perfected, was able to hold

its own in a permanent form. He collected the intermediate stages through which a good rifle arose out of a bad one; and the idea began to cross his mind that the course of change which happened to rifles was very much what ordinarily happens with other things.

So he set about collecting, and filled his house from the cellar to the attic, hanging on his walls series of all kinds of weapons and other instruments which seemed to him to form links in a great chain of development. The principle that thus became visible to him in weapon-development is not less true through the whole range of civilization; and we shall soon be able to show to every anthropologist who visits Oxford the results of that attempt. And when the development theory is seen in that way, explaining the nature and origin of our actual arts and customs and ideas, and their gradual growth from ruder and earlier states of culture, then anthropology will come before the public mind as a new means of practical instruction in life.

Speaking of this aspect of anthropology leads me to say a word on another hardly less important. On my first visit to this country, nearly thirty years ago, I made a journey in Mexico with the late Henry Christy, a man who impressed his personality very deeply on the science of man. He was led into this subject by his connection with Dr. Hodgkin; the two being at first interested, from the philanthropist's point of view, in the preservation of the less favored races of man, and taking part in a society for this purpose known as the Aborigines' protection society. The observation of the indigenous tribes for philanthropic reasons brought the fact into view that such peoples of low culture were in themselves of the highest interest as illustrating the whole problem of stages of civilization; and this brought about the establishment of the Ethnological Society in England, Henry Christy's connection with which originated his plan of forming an ethnological museum. The foundations of the now celebrated Christy collection were laid on our Mexican journey; and I was witness to his extraordinary power of knowing, untaught, what it was the business of an anthropologist to collect, and what to leave uncollected: how very useless for anthropologic purposes mere curiosities are, and how priceless are every-day things. The two principles which tend most to the successful work of anthropology—the systematic collection of the products of each stage of civilization, and the arrangement of their sequence in development—are thus the leading motives of our two great anthropological museum.

To my mind, one of the most remarkable things I have seen in this country is the working of the bureau of ethnology as part of the general working of the Government department to which it belongs. It is not for me, on this occasion, to describe the working of the Smithsonian Institution, with its research and publications extending almost through the whole realm of science; nor to speak of the services of that eminent investigator and organizer, Prof. Spencer F. Baird. It is the department occupied with the science of man of which I have experience; and I do not think that anywhere else in the world such an official body of skilled anthropologists, each knowing his own special work, and devoted to it, can be paralleled. The bureau of ethnology is at present devoting itself especially to the working-up of the United States, and to the American continent in general, but not neglecting other parts of the world. And I must say that I have seen with the utmost interest the manner in which the central organism of the bureau of ethnology is performing the functions of an amasser and collector of all that is worth knowing; how Major Powell is not only a great explorer and worker himself, but has the art of infusing his energy and enthusiastic spirit through the branches of an institution which stands almost alone, being, on the one hand, an institution doing the work of a scientific society, and, on the other hand, an institution doing that work with the power and leverage of a government department. If we talked of working a government institution in England for the progress of anthropology in the way in which it is being done here we should be met with—silence, or a civil answer, but with no practical result; and any one venturing to make the suggestion might run the risk of being classed with that large body described here as "cranks." The only way in which the question can be settled, how far a government may take up scientific research as a part of its legitimate functions, is by practical experiment; and somehow or other your president is engaged in getting that experiment tried, with an obvious success, which may have a great effect. If in future a proposition to ask for more government aid for anthropology is met with the reply that such ideas are fanatical, and that such schemes will produce no good results, we have a very good rejoinder in Washington. The energy with which the Bureau of Ethnology works throughout its distant ramifications has been a matter of great interest. It is something like what one used to hear of the organization of the Jesuits, with their central authority in a room in a Roman

palace, whence directions were sent out which there was some agent in every country town ready to carry out with skill and zeal. For instance, it was interesting at Zuñi to follow the way in which Colonel and Mrs. Stevenson were working the pueblo, trading for specimens, and bringing together all that was most valuable and interesting in tracing the history of that remarkable people. Both managed to identify themselves with the Indian life. And one thing I particularly noticed was this, that to get at the confidence of a tribe, the man of the house, though he can do a great deal, cannot do all. If his wife sympathizes with his work, and is able to do it, really half of the work of investigation seems to me to fall to her, so much is to be learned through the women of the tribe which the men will not readily disclose. The experience seemed to me a lesson to anthropologists not to sound the "bull-roarer," and warn the ladies off from their proceedings, but rather to avail themselves thankfully of their help.

Only one word more, and I will close. Years ago, when I first knew the position occupied by anthropology, this position was far inferior to that which it now holds. It was deemed, indeed, curious and amusing; and travelers had even, in an informal way, shown human nature as displayed among out-of-the-way tribes to be an instructive study. But one of the last things thought of in the early days of anthropology was that it should be of any practical use. The effect of a few years' work all over the world shows that it is not only to be an interesting theoretical science, but that it is to be an agent in altering the actual state of arts and beliefs and institutions in the world. For instance: look at the arguments on communism in the tenure of land in the hands of a writer who thinks how good it would be if every man always had his share of the land. The ideas and mental workings of such a philosopher are quite different from those of an anthropologist, who knows land-communism is an old and still existing institution of the world, and can see exactly how, after the experience of ages, its disadvantages have been found to outweigh its advantages, so that it tends to fall out of use. In any new legislation on land, the information thus to be given by anthropology must take its place as an important factor.

Again: when long ago I began to collect materials about old customs, nothing was farther from my thoughts than the idea that they would be useful. By and by it did become visible, that to show that a custom or institution which belonged to an early state

of civilization had lasted on by mere conservatism into a newer civilization, to which it is unsuited, would somehow affect the public mind as to the question whether this custom or institution should be kept up, or done away with. Nothing has for months past given me more unfeigned delight than when I saw in the *Times* newspaper the corporation of the city of London spoken of as a "survival." You have institutions even here which have outlived their original place and purpose; and indeed it is evident, that when the course of civilization is thoroughly worked out from beginning to end, the description of it from beginning to end will have a very practical effect upon the domain of practical politics. Politicians have, it is true, little idea of this as yet. But it already imposes upon bodies like this Anthropological Society a burden of responsibility which was not at first thought of. We may hope, however, that under such leaders as we have here, the science of anthropology will be worked purely for its own sake; for, the moment that anthropologists take to cultivating their science as a party-weapon in politics and religion, this will vitiate their reasonings and arguments, and spoil the scientific character of their work. I have seen in England bad results follow from a premature attempt to work anthropology on such controversial lines, and can say that such an attempt is not only in the long-run harmful to the effect of anthropology in the world, but disastrous to its immediate position. My recommendation to students is to go right forward, like a horse in blinkers, neither looking to the right hand nor to the left. Let us do our own work with a simple intention to find out what the principles and courses of events have been in the world, to collect all the facts, to work out all the inferences, to reduce the whole into a science; and then let practical life take it and make the best it can of it. In this way the science of man, accepted as an arbiter, not by a party only, but by the public judgment, will have soonest and most permanently its due effect on the habits and laws and thoughts of mankind.

I am afraid I have not used well, under such short and difficult conditions, the opportunity which you have done me the great pleasure and honor of giving me here. I have tried, as I said I would, to put in the simplest way before you some considerations which appear to me as of present importance in our science, both in the old world and in the new, and I thank you in the heartiest way possible for the opportunity you have given me to do this.

At the close of the address a vote of thanks was moved by Judge Arthur McArthur, of the Supreme bench of the District of Columbia, and passed unanimously.

The President announced that by direction of the Council there would be no regular meeting of the Society until the third Tuesday in November.

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EIGHTY-FIFTH REGULAR MEETING, November 18, 1884.

Major J. W. POWELL, President, in the Chair.

The President stated that by action of the Council a place for the future meetings of the Society had been secured at the Columbian University.

The Secretary of the Council announced the election of Mr. M. D. Kerr, of the U. S. Geological Survey, as an active member of the Society.

A paper entitled "AUSTRALIAN GROUP RELATIONS," by Alfred W. Howitt of Gippsland, Australia, was then read by Col. Seely.*

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EIGHTY-SIXTH REGULAR MEETING, December 2, 1884.

Major J. W. POWELL, President, in the Chair.

The Secretary of the Council announced the election as active members of Messrs. Victor Mindeleff, Cosmos Mindeleff, Wm. M. Poindexter, and Wm. H. Babcock.

Dr. FRANZ BOAS read a paper on "THE ESKIMO OF BAFFIN LAND."

Although the shores of Baffin Land have been visited by whalers for a very long time, there was still little known about the Eskimo tribes inhabiting this tract of land.

The southwesternmost region, the land about King's Cape, is called by the natives Sicosuilar, *i. e.*, a land which has no fixed ice floe during the winter. It is inhabited by the Sicosuilarmiut, who go deer hunting in the low land farther north. They have intercourse with the natives of the north shore of Labrador, the Iglu-

* Printed in the Smithsonian Report for 1883.

miut, *i. e.*, the inhabitants of the other side, crossing Hudson Strait from King's Cape to Cape Wolstenholme.

The middle region of the north shore of Hudson Strait is inhabited by the Akudliarmiut who go deer hunting to the large lake Agmakdgua, where they meet with the Nugumiut, the inhabitants of the peninsula between Frobisher Bay and Cumberland Sound. The shore of Davis Strait is divided into three parts:—Oko, Akudnirn, and Aggo, *i. e.*, the lee side, the centre, and the weather side. Oko, the land of the Cumberland Sound, is inhabited by the Okomiut who in olden times were divided into the Tellirpingmiut on the west shore of Cumberland Sound; the Kinguamiut, at the head of it; the Kignaitmiut on the high Cumberland peninsula, and finally the Saumingmiut on Davis Strait, as far as Exeter Bay and Cape Dier. As the number of the Okomiut has been greatly diminished there scarcely exists any difference between these tribes now.

The inhabitants of Padli are nearer to the Akudnirmiut than to the Okomiut. The Aggomiut consist of two tribes: The Tudnumirmiut of Pond's Bay, and the Tudnunirossirmiut of Admiralty Inlet. Besides there are the Iglulingmiut of Fury and Hecla Strait, with whom we have been made acquainted by Parry and Hall.

I have visited the different tribes of Cumberland Sound and Davis Strait as far as Akudnirn, and no settlement in this country escaped my notice. As there are quite a number of natives of different tribes settled among these I was able to gather a good deal of information about all the Eskimos from Sicosuilar to Tudnunirn.

The most interesting tribe are the Tellirpingmiut, the inhabitants of the west shore of Cumberland Sound, more particularly speaking, of Nettilling fiord. This is one of the few Eskimo tribes living inland. From former reports we only learned that the Kinnepatu, the Eskimo of Chesterfield Inlet, on the west shore of Hudson Bay, live nearly all the year round on deer and musk oxen, which they hunt on the plains between Back River and Chesterfield Inlet, only coming down to the seaside during the winter.

At the present time the Tellirpingmiut have the same custom. In the month of May they leave their winter settlement and travel with their dogs and sledges inland to the large lake Nettilling, (Lake Kennedy, of the old charts) and get to the place of their settlement, Tikerakdjuak, on the south shore of the lake, long before the ice breaks up. They take with them one or more bags of blubber for their lamps; but sometimes they do not even carry

as much, as they are able to cook with the heather found in abundance on the vast plains of the lake, and burn deer marrow in their lamps.

Now and then they secure a seal in the lake, but they cannot rely on their hunt as these animals are too few in number. In the western part of the lake they seem to be more plentiful; but in the eastern portion their number has been greatly diminished. I suppose that this is principally the reason why the Tellirpingmiut do not any longer stay all the year round on the shores of the lake as many of them formerly did. They seem to have spent there the greater portion of their lives, occasionally visiting the seaside to provide themselves with skins of the young and old seals. It very seldom happens now that any men winter inland, as the number of seals is too small. In the spring of the year they live on deer and the innumerable birds which are caught while molting. The Eskimos return to the entrance of Neltilling fiord about the beginning of December, when the ice in the fiords is strong and well covered with snow.

The other Okomiut, who are settled in four places on the west shore, two on the east shore, and one between Cape Mercy and Cape Micklesham, never leave the coast for any length of time. Only a few go in their boats also to Lake Nettilling, as this is the best place for deer hunting. They leave after the breaking up of the ice in July and return during the first days of October.

By far the most of them spend the summer at the head of the fiords whence they start deer hunting inland, returning after a few days' absence. The old men and the women meanwhile live on salmon which are caught in abundance in the small rivers emptying into the fiords. In winter they settle on the islands nearest to the open sea. Throughout the cold months until the sun rises higher they go sealing with the harpoon, watching the seal at its breathing hole. In March, while the seal brings forth its young, all the natives are eager to secure as large a number as possible of young seal skins, which are highly valued for the under jackets and winter pants for men and women.

In the fall the inhabitants of Saumia and Padli secure a great number of walruses which supply them with food and blubber until late in the winter. They only go sealing in order to enjoy themselves, as they generally have sufficient walrus meat to last them the whole year.

Sometimes even there is some left in summer. In spring they go bear hunting. The skins of these animals are exchanged for guns and ammunition, when the whalers visit the coast returning from their hunting grounds off Lancaster Sound.

The Tudnunirmiut hunt the white whale and the narwhal whose ivory is highly valued.

Though the Eskimos shift their habitations according to the seasons from one place to another we must not consider them a people without stationary abodes, for at certain seasons they are always found at the same places.

There are some doubts about the origin of the old stone foundations met with in every part of Arctic America, even in countries not any longer inhabited by Eskimos, as the Parry Archipelago and the northern part of East Greenland. It was believed that the central Eskimos forgot the art of building stone houses and only lived in snow huts.

In Baffin Land I found a great number of stone, turf, and sod foundations, apparently of very ancient origin. If the Eskimos come to a place where they know that stone houses exist they build these up into a comfortable home, covering the old walls with a double seal-skin roof and heather. In the settlement Anarnitung, near the head of Cumberland Sound, and at Okkiadliving, on Davis Strait, they frequently live in these houses which they call Kagmong.

I found two different styles of construction, one with a very large floor and a remarkably short bed-place; the other with both parts of about the same size. The former the Eskimos ascribe to the Tunnit, or as they are often called, Tudnikjuak, a people playing a great part in their tales and traditions. The latter are ascribed to their own ancestors, the ancient Eskimos.

Indeed they do not build any stone houses now, as they always find in the places of their winter settlements the old structures which are fully sufficient for the number of men inhabiting the country now, which is very small as compared with that of former times. From different reports I conclude that Cumberland Sound about fifty years ago was inhabited by 2,500 Eskimos who are now reduced to about 300 souls.

In winter time they mostly build snow houses consisting of a high dome with a few smaller vaults attached, used as entrances which keep the cold air out of the main room. The Okomiut and Akud-

nirmiut cover the inside of the same with seal-skins; while the Nugumiut and Akudlirmiut leave the walls bare. They cut the pieces of snow much thicker and bury the whole house in loose snow which they stamp down with their feet.

In summer they live in tents made of seal-skin. The back part is formed by six poles, arranged in a semicircle and lashed together at their converging points. Two poles run from this junction to the entrance, which is also formed of two poles. The Okomiut build the back part of the tents much less steep than the Akudnirmiut. The Aggomiut use a tent with only one pole in the center, and one for the entrance.

I have been informed that three different styles of clothing are used in Baffin Land, two of which I have seen myself. The Sicosuilarmiut are said to use jackets with a broad tail and a hood, which latter is not pointed. The Nugumiut and Okomiut are very well clad, having their garments neatly trimmed with skins of different color and adorned with skin straps. Their hoods are long pointed, and the tails of the women's jackets very narrow. The jackets of the men have either no tail whatever, or one that is very short. The women's pants consist of two parts, the leggins being fastened by a string to the short breechlets.

The Akudnirmiut and Aggomiut use very large hooded jackets with a small point at the top. Their clothing is much inferior to that of the Okomiut. I have seen scarcely any attempt to adorn it in any way. The women wear very large boots which reach up to the hips. In Pond's Bay they are sometimes kept up by whale bone, and they are in the habit of carrying the young children in them.

There exist only very slight differences in the dialects from Akudliak to Pond's Bay, and those I found refer only to the vocabulary. However, in the most common phrases, the way of greeting, etc., every tribe has its own style. Nor could I find any differences with reference to their traditions. It is possible that a number of the Oko stories are unknown in Tudnunirn, and *vice versa*, but I am not sufficiently acquainted with the Tudnunirmiut to positively decide the question.

There are some differences between the Okomiut and the Akudnirmuit in the arrangement of feasts, which are repeated every fall, during which some natives make their appearance disguised and masked as representatives of a fabulous tribe.

All the Eskimos of Baffin Land are fond of music and poetry. They sing the old songs of their people, and spend the long winter nights telling traditions and singing the old monotonous tunes of their songs or composing new ones. I made the acquaintance of a few poets whose songs were known in every place I visited.

All their tales and the themes of the old songs are closely connected with their religious ideas. Though there is a strong resemblance between many of their own traditions and those of the Greenlanders, I found quite a number of new tales and religious ideas hitherto unknown. They are familiar with the Erkilik of the Greenlanders, whom they mostly call Adlet, and the Tudnik, who, however, do not inhabit the interior but are said to have lived formerly with the Eskimos on the same shores and in the same settlements. According to their tradition, which is only preserved in parts in Greenland, the Adlet, Kodlunarn, (white men) and Innuit are the children of one mother and her husband, a red dog, who lived at Igluling, in Fury and Hecla Strait. From there all the different tribes of Innuit are said to have spread over the country, now occupied by them.

It is worth noticing that the Labrador Eskimos know the Adlat and the Tudnik too. In Erdmann's Wörterbuch des Labrador Dialects, Adlat is explained as Indian of the Interior; Tudnik as a Greenlander. I believe, however, that these meanings were given to these words by the missionaries, while in reality they signify the same as in Baffin Land and Greenland. To learn whether there are any traditions relating to the Adlat or Erkillek would be of special interest.

The Eskimos of Baffin Land have no knowledge of the Supreme Being, Torngarsuk, whom the Greenlanders once considered to be superior to all the numerous lower spirits called the Torgnet. Of these there are a great many, but the most prominent ones appear in the shape of a bear, a man, or a woman, inhabiting the large boulders, which are found in great numbers scattered over the country.

These spirits act as genii of certain favored men who by their aid become great sorcerers. They are able to cure dieases, to detect offences, to give good luck in hunting, and they visit the spirits of the moon and of the stars.

The Eskimos entertain a great fear of the Tupilat, the Spirits of the Dead, who kill every one daring to offend them. This is the

reason why they are afraid to touch the corpse of the deceased, and why they destroy every object which once belonged to a dead Eskimo.

The soul of the dead Innung goes to the land Adlivum, beneath the earth of which an evil spirit, Sedna, is mistress. In olden times she was an Eskimo woman herself, married to a fulmar who used her very badly. She escaped in the boat of her father who flung her overboard to save his own life from the wrath of the bird, after having detected the loss of his wife. While Sedna clung to the edge of the boat the father cut off her fingers which were changed into seals and whales. To revenge herself she caused two dogs to gnaw off her father's feet and hands. Then the earth opened and they went down to the land Adlivum. As the Eskimos kill the seals and whales that have risen from Sedna's fingers she hates and pursues them. Only those who come to an unnatural death escape her and ascend to Heaven to the land Kudlivum where innumerable deer are found, and where they are never troubled by either ice or snow.

Sedna is feared by the Eskimos even more than the Tupilat and the traditions about her have the greatest influence on their habits, manifesting itself mostly in laws about food and interdiction of labor on certain days.

To compare the habits and traditions of the Eskimos of Baffin Land with those of the Smith Sound and Greenland will be of much interest, as these tribes connect the central with the eastern Eskimos.

Tribes which may easily be studied, and whose customs are of prime importance are the Sicosuilarmiut and Iglumiut, and their connections with the Labrador natives. It is a matter of regret that so little is known of the inhabitants of Southampton Island and of the west shore of Hudson's Bay, although Hall spent five winters in those regions. The researches of Mr. Turner in Ungava will fill a great gap in our knowledge of the central tribes.

Another tribe of great importance are the inhabitants of Admiralty Inlet, who seem to be very numerous up to the present time.

Even now it is possible to trace the connection between the tribes from King William's Land to Smith Sound and Labrador. The Netchillirmiut of Boothia Felix, who are now mixed with the Ugjulirmiut of King William's Land and Adelaide Peninsula most probably occupy part of the old country of the Ukusiksalingmiut of Back River. These natives, who live principally upon musk oxen, cross

the land in visiting the shores of Wager River. The Netchillik Eskimos travel through the land of the Sinimiut of Pelly Bay to Eivillik (Repulse Bay). The Eivillinmiut frequently have intercourse with the Igluling tribe, who formerly visited the Cumberland Sound Eskimos by the way of Majoraridjen, the country north of Lake Nettilling (Lake Kennedy). Three roads are used in traveling from Igluling to the west shore of Baffin Bay and to Lancaster Sound, the most western through the fiord Tessiujang, near Cape Kater, to Admiralty Inlet; the other to Ikalualuin (Arctic Sound) in Eclipse Bay and the third one to Anaulereelling (Dexterity Bay). The Tudnunirossirmiut sometimes cross Lancaster Sound, and were found on the western part of North Devon, which they call Tudjan. They cross this land and Jones Sound on sledges and have intercourse with a tribe on Ellesmere Land, which they call Umingmamnuna. From Bessels' researches we know that they cross Smith Sound, for he found amongst the Ita-Eskimos a man who had lived in former years amongst the Akudnimiut on the east coast of Baffin Land. I myself found a native near Cape Kater, north of Home Bay, who had lived somewhere near Cape Isabella at the entrance of Smith Sound for several years.

The questions which may be settled by a more thorough knowledge of the habits and traditions of all these and the more western tribes which have scarcely been seen by any white men, may prove of prime importance for the solution of the question relating to the origin and migrations of this people.

Mr. JOHN MURDOCH read the following paper on "SEAL CATCHING AT POINT BARROW."

The capture of seals is one of the most important of pursuits among the Eskimos of the two villages at Point Barrow. A failure of the seal harvest would be as disastrous to them as the failure of the potato crop to the Irish, or the rice crop in India. Not only does the flesh of the seal form the great staple of food, but its fat furnishes them with oil to light and warm their winter houses, to oil their water-proof boots and harpoon lines, and to keep the water out of their skin boats. The skin serves to make their water-proof boots and leggings, the soles of their winter boots, canteens, the covers of the kaiaks, or small skin canoes, and, rarely, their outer clothing; cut into thongs it furnishes a serviceable cord which they make into nets and harpoon lines, and employ for all the varied

purposes for which we use cord. In former times and occasionally at present, the skin served to cover the summer tent, or *tŭ pĕk*. No part of the animal is wasted. Even the entrails are saved, and dressed, and made into water-proof frocks to wear over the fur clothing in rainy and snowy weather. If their were no seals at Point Barrow there could be no Eskimos, barren as the country is of fish and reindeer.

The following species are pursued: First, and most important, the Ringed Seal or Nĕtyĭ (*Phoca foetida*). This is *the* seal par excellence, and the only one taken in any considerable numbers, by all the methods which will be described hereafter. Next in importance is the great Bearded Seal, úg'ru (*Erignathus barbatus*). This is comparatively rare, though a good many are taken much in the same manner as the walrus with the heavy harpoon and rifle from the umiak. The skins are especially valued for covering the large skin boats, and for making heavy harpoon lines. The other two species are of extremely rare occurrence. The Harbor Seal, kasĭgïä, (*Phoca vitulina*) is occasionally caught in summer in the nets at Elson Bay, and the rare and beautiful Ribbon Seal (*Histriophoca fasciata*), the kaixólĭñ, is now and then taken in the early winter.

When the ice-pack comes in in the autumn, and the sea is beginning to close, it may be about the middle of October, the natives who are now all back from their summer wanderings and settled for the winter, begin the pursuit of the ne'êtyê. At this season there are many open holes in the pack to which the seals resort. Here they are taken by shooting them with the rifle as they show their heads above water, and securing them with the retrieving harpoon or naúlĭgû. The line and harpoon-head belonging to this are generally carried attached to the gun-case which is slung across the shoulders, and the shaft serves as a staff for walking and climbing about the rough ice. A hunter is lucky if he secures more than one or two seals in this way in a day's tramp. He generally drags his game home by a line looped through a hole in the under jaw. Wherever the sea is sheltered by grounded ice, it will freeze on calm nights to the depth of three or four inches, and in these newly-formed fields of ice are soon to be found small round holes, which the seals have kept open for fresh air. The natives resort to these holes, provided with a rifle, a different form of harpoon, the úna, with a long, slender, loose-shaft, fitted for thrusting through the small hole, and a little three-legged stool, nĭgäwau'otĭn, just

large enough for a man to stand upon, to keep the feet from getting chilled by the ice. A little rod of ivory is sometimes thrust down through the hole to indicate the approach of the seal, and the hunter standing or squatting on the stool with his rifle and spear in readiness, waits patiently for the seal to come. As soon as he comes to the surface he is shot through the head and the úna is immediately thrust down through the hole to secure him. The ivory icepick, túu, serves to make the hole large enough to drag him through. Both these methods of hunting are pursued during the whole winter whenever there are open holes or fields of newly-formed ice, and natives are continually scouring the ice-field armed with rifle and naúlĭgû, in the hopes of finding open holes. The greatest catch of the year known takes place after Nov. 15th, when the sun has sunk below the horizon for his 72 days' absence, and the nights are long and dark, while the days are only a few hours' twilight. At this season, wide cracks frequently form in the pack, miles in length and a mile or two from the shore, and of course are a great resort for the seals. As soon as such a crack is discovered, and scouts are continually on the watch for them, the men turn out in force and skirt along the edge of the crack till they find a suitable place for setting their nets. A place is selected where the ice is level and not too thick for about 100 yards from the edge of the crack, and the nets are set as follows: The net is made of seal-thong in large meshes, and is about 15 or 16 feet long by 10 deep. Two small holes are dug through the ice, about the length of the net apart, in a line parallel to the edge of the crack, and between them is cut a hole large enough to admit the passage of a seal. A long line with a plummet on the end is let down through one of the small holes and grappled and drawn up through the middle hole by a long, slender pole with a hook on the end of it. This is made fast to one upper corner of the net, and a similar line drawn through the other small hole and made fast to the other upper corner. By hauling on these lines the net is drawn down through the middle hole and hangs like a curtain under the ice. A line is also attached to it by which it can again be drawn up through the middle hole. The end lines are loosely made fast to lumps of ice and as darkness sets in the hunter stations himself near the hole and begins rattling gently on the ice with the butt of his spear, scraping with a tool made of seals' claws mounted on a wooden handle, or making any gentle monotonous noise. This excites the curiosity of the seals who are cruising

around in the open water, and one will at last come swimming in under the ice towards the sound. Of course he strikes against the loose net, runs his head or flipper through it and his struggles to escape only serve to entangle him still more. The running out of the end lines informs the hunter that there is a seal in the net. He waits till he thinks that he is sufficiently entangled, and then hauls him up through the middle hole. If he is not already drowned, his neck is broken by bending the head back sharply, and he is disentangled from the net which is set again. Of course, he very soon freezes stiff, and if there is enough snow on the ice, he is stuck up on his tail, so as not to be covered up and lost should a drifting snowstorm come on. One man has been known to take as many as thirty seals in this way in a single night. This method of fishing can only be practiced in the darkest nights. A bright moonlight, or even a bright aurora seriously interferes with success. The dark nights in December, when the moon is in southern declination and does not rise, are generally the times of a great catch. The dead seals are stacked up and brought in when convenient by the women and dogsleds. Any small crack in the ice to which the seals resort is immediately surrounded by a cordon of nets which are visited every two or three days, and many seals are thus taken. About the end of February, when the sun is bright and the ice thick, the seals have formed permanent breathing-holes to which many resort. When such a hole is found, a net is set flat underneath it, by making four or five holes round it, drawing the net down through the main hole, and the corners out to these holes. One man, who has stayed at home from the spring deer-hunt, will generally have three or four nets set in this way, which he visits every few days. This method of netting is kept up during the spring till the ice begins to melt on the surface and the seals come out on it, where they are sometimes shot. Many seals are killed with rifle and naúlĭgû from the Miaks when whaling or hunting walrus in the spring and summer, and they are also caught in nets set along shore in Elson Bay.

There is still one more method of taking seals seldom practiced near the villages, and only in the summer. This is with the light darts, kúkigû, from the kaiak. These darts are so arranged that the little barbed head is detachable and attached to the shaft by a line forming a bridle, which always pulls the shaft transversely through the water. Three of these darts are carried in the kaiak and darted into the seal with a hand board. The resistance of all three shafts wearies the seal out until he can be approached and despatched.

DISCUSSION.

Mr. DALL gave a description of Norton Sound, which is a shallow estuary subject to sudden changes in depth due to direction of wind. Seal fishing in winter is practiced on the edge of the ice about ten to twenty miles from shore, but is attended with much danger owing to the liability of the floe to break up and go to sea with a strong eastwardly wind. The best seasons are early autumn and spring. In summer short nets supported by three stakes driven in the mud in about one to two fathoms water where thereis current are used and take many seal. The upper edge of the net is taut, the lower part hangs nearly free, and about five feet in height. The seal are usually drowned in the net, but if living are killed with a club. If a seal is shot and then secured, a pin like a large nail with a broad head is fastened in the wound to prevent loss of blood which is much esteemed in the Innuit cuisine.

A peculiar spear or lance is used by the Nunivak people, being a three-sided ivory point as large as the biggest walrus tusk will make, straight, mounted on a heavy wooden shaft. The head may be eighteen inches long, is drilled in the median line of each face to the center of the blade, and a slit is then sawed nearly the whole length. the three slits meet in the center which is entirely excavated, but without enlarging the slits which remain only as wide as the thickness of the saw. Pressure from behind springs out the thin walls of the lance head which has a sharp apex—on the removal of pressure the walls resume their position gripping firmly the tissues which have protruded into the slips. Pulling only tightens the grip. This style of lance has not as far as the speaker was aware been any where described, though the specimens which he saw in 1868 were afterwards sent to one of the museums in Germany.

Responding to a question, Mr. DALL said that he thought we were not at present in a position to adjudge whether the Eskimo were related to the cave dwellers as advocated by Dawkins, though their mode of life presents many similarities.

Prof. MASON spoke of the richness of information now at our command in Washington, Greenland being represented by Dr. Bessels; Cumberband Gulf by Dr. Boas; Ungava Bay by Lucien M. Turner; Point Barrow by Mr. Murdock; and the Western Eskimos by Mr. Dall. He also called the attention of the Society to the great amount of invention wrapped up in an Eskimo harpoon. Hitherto students had been satisfied with speaking of harpoons with-

out specifying the variety; but Mr. Murdoch's own collection contained three types: lances, darts, and harpoons. Of lances there were three kinds, the whale, the walrus, and the deer lance. Of darts there were several varieties, all carried by the throwing stick, among them the bird or pronged dart (with or without side prongs), the feather dart, the float dart, the bridle or martingale dart, and the harpoon dart. Of harpoons Mr. Murdoch could exhibit several varieties. The most interesting was the retriever. The Eskimo standing on the edge near thin ice shoots the seal in the water, and after breaking a channel with the ice-pick on one end, launches the whole implement at the animal, holding on to a line attached to the harpoon. By this means he could draw the dead body to the thick ice.

Mr. MURDOCH, in answer to a question of Dr. Bessels, said the seal-nets appear to have never been made from whalebone. Nets of this material with small mesh are used for taking whitefish, &c. The seal-net is a comparatively modern invention. Nīkawáalu, an intelligent middle-aged native, full of tradition, says "Adráni (beyond the memory of man now living) there were no nets and they killed seals with the spear (únä) only." No work that requires hammering or pounding on wood must be done during the whaling season, and even rapping with the knuckles on wood is bad. They asked us to leave off work on our block-house in the spring of 1882, saying it would drive off the whales. The whaling was a failure that season.

Mr. MURDOCH also stated the following myths:

A'sĕlu, the mythical dog, was tied to a stake. He gnawed himself loose, and went into the house where he found an Eskimo women, with whom he had sexual intercourse. From this woman sprang the human race.

A "doctor" starting on a fishing trip in the fall gave tobacco to the dead man at the cemetery, breaking off tiny bits and throwing them into the air. When he arrived at the river he also gave tobacco in the same way to the demon *Tuûñ-a*, saying "Tuûña, Tuûña, I give you tobacco! Give me plenty of fish."

They said the aurora (kiólyä) was *bad*, that there was danger of its striking a man in the back of the neck and killing him. Consequently, in coming to and fro from the village after dark in twos or threes (they never dare go alone), one carries a drawn knife or dagger to thrust at the Aurora and drive it away. Frozen dogs' excrement thrown at the aurora will also drive it off.

During a bright aurora the children especially sing to it, sometimes nearly all night, performing a stamping dance, with the fists clenched. The song has many verses, with the same refrain. The first verse, as follows:

"Kiólyă ke! Kiólyă ke!
A yáñă, yáñă, ya!
Hwi, hwi, hwi, hwi!"

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EIGHTY-SEVENTH REGULAR MEETING, Dec. 16, 1884.

Major J. W. POWELL, President, in the Chair.

The Secretary of the Council announced the election of Admiral Thornton A. Jenkins, U. S. N., Mr. John Murdock, and Mr. Lucien M. Turner as active members of the Society.

The Curator presented a report showing the receipt of seventy-three gifts, comprising books, papers, and pamphlets, as follows:

GIFTS.

From the DIRECTOR.—Second Annual Report of the Bureau of Ethnology. 1880–81. Major J. W. Powell. Washington. 1883. Pp. 487. 8°. Illustrations and plates.

From Mr. GEO. F. BLACK.—British Antiquities; their present treatment and their real claim. By A. Henry Rhind. Edinburgh. 1885. Pp. 47. 8°.

—— Notice of a collection of flint implements found in the neighborhood of Fordoun, Cincardineshire. Rev. James Brodie. Pp. 5.

—— On certain beliefs and phrases of Shetland Fishermen. Arthur Laurenson. Pp. 6.

—— Did the Northmen extirpate the Celtic inhabitants of the Hebrides in the 9th century? Capt. F. W. L. Thomas, R. N. Pp. 35.

—— Notice of a collection of flint arrow-heads and bronze and iron relics from the site of an ancient settlement, recently discovered in the Culbin Islands, near Findhorn, Morayshire. Hercules Linton. Pp. 4.

—— Notes respecting two bronze shields recently purchased for the museum of the Society, and other bronze shields. Wm. T. McCulloch. Pp. 4.

From the DIRECTOR.—Notes on Mediæval "Kitchen Middens" recently discovered in the monastery and nunnery on the Island of Iona. John Alexander Smith. Pp. 14.

—— Note of a fragment of a Rune-inscribed stone from Aith's Vol. Cummingsburgh, Shetland. George Stephens. Pp. 6.

—— Letter to the Schoolmasters of Scotland, from the Society of Antiquaries. Edinburgh. 1860. Pp. 13.

—— Note on a cist, with an urn, discovered at Parkhill, near Aberdeen, in Oct., 1881. Wm. Ferguson. Pp. 4.

—— Notes on some stone implements, &c., from Shetland. John Alexander Smith. Pp. 9.

—— Notice of the discovery of a massive silver chain of plain double rings or links at Hardwell, Berwickshire. By the Hon. Lord Douglas. With notes of similar silver chains found in Scotland. By John Alex. Smith. Pp. 7.

—— Notes on the Antiquities of the Island of Tiree. J. Sand. Pp. 5

—— Notice of a sculptured stone, bearing on one side an inscription in runes, from Kilbar, Island of Barra. Dr. Geo. Stephens. Pp. 4.

—— Notice of a Cranium found in a short cist near Silvermoor, Carstairs Lanarkshire. D. R. Rankine. Pp. 3.

—— Notice of an underground structure recently discovered on the farm of Mickle Kinord, Aberdeenshire. Rev. J. G. Michie. Pp. 3.

—— Notice of shell-mounds at Lossiemouth. E. G. Duff. Pp. 2.

—— Notice of urns in the museum that have been found with articles of use or ornament. Joseph Anderson. Pp. 16.

—— Notice of a hoard of bronze weapons and other articles found at Monadh-Mor, Killin. Charles Stewart. Pp. 5.

—— Notice of a flint arrow-head in the shaft, found in a moss at Fyvie, Aberdeenshire, with notes in illustration of the manufacture of arrow shafts with flint tools. Joseph Anderson. Pp. 6.

—— Notes on the character and contents of a large sepulchral cairn of the bronze age at Collessie, Fife, &c. Joseph Anderson. Pp. 23.

—— Notes on the contents of shell-heaps recently exposed in the Island of Coll. Donald Ross. Pp. 2.

—— Notice of ancient graves at Doudan, near Ballantrae, Ayrshire. John Carrick Moore. Pp. 3.

—— Donations to the museum. Francis Abbott. Pp. 3.

—— On the presentation of national antiquities and monuments in Denmark. J. J. A. Worsaae. Pp. 15.

From the DIRECTOR.—Notes of some recent excavations in the Island of Unst, Shetland, and of the collections of stone vessels, implements, etc. Thomas Edmonston. Pp. 5.

—— Note of a donation of four sculptured stones from Monifieth, Forfarshire. James Neish. Pp. 8.

—— Notes of the sculptured caves near Dysart, in Fife, &c. Miss C. Maclagan. Pp. 14.

—— Notice of the discovery of two sculptured stones, with symbols, at Rhynie, Aberdeenshire. Miss C. Maclagan. Pp. 3.

—— Notice of excavations in Cannis, in Strathnaver, Sutherlandshire, &c. John Stewart. Pp. 5.

From Prof. L. STIEDA.—Anthropologische Untersuchungen am Becken lebender Menschen. Paul Schröter. Dorpat. 1884. Pp. 83.

From the AUTHOR.—H. Fischer. On stone implements in Asia. Worcester, Mass. 1884.

From the AUTHOR.—Dr. H. F. C. Ten Kate. Quelques observations sur les Indiens Iroquois. Pp. 5. From *Revue d'Anthrop., de Paris.*

—— Sur la synonymie ethnique et la Toponymie chez les Indiens de l'Amérique du Nord. Amsterdam. 1884. Pp. 11.

[Reprinted from Trans. Roy. Acad. Sci. Amsterdam.]

—— Variétés. Notes sur l'ethnographie des Zuñi. Pp. 3.

—— Quelques observations ethnographiques recueillies dans la presqu'ile Californienne et en Sonora. Pp. 6.

—— Sur Quelques Crânes de l'Arizona et du Nouveau Mexique. Pp. 7.

(Extrait de la *Revue d'Anthropologie.*)

—— Matériaux pour servir à l'Anthropologie de la presqu'ile Californienne. Paris. 1884. Pp. 19.

[From Bull. Soc. d'Anthrop.]

From the AUTHOR.—Alph. de Candolle. Hérédité de la couleur des yeux dans l'espèce humaine. Geneva. 1884. Pp. 23.

[Ext. Arch. des Sciences Physiques et Naturelles.]

From the AUTHOR.—Baron Joseph De Baye. Sujets décoratifs au Règne Animal dans l'industrie Gauloise. Paris. 1884. Pp. 8.

[Ext. Mem. Nat. Soc. of Antiquaries of France.]

From the AUTHOR.—Adrian de Mortillet. Premier décade paléoethnologique. Paris. 1881. Pp. 11.

—— Deuxième décade paléoethnologique. Paris. 1882. Pp. 15.

From the AUTHOR.—Heinrich Fisher. Le Précurseur de l'Homme. 1884. (L'Homme, No. 13.)

—— Evolution des espèces, évolution des mots. (L'Homme, No. 20.) Further remarks on Nephrite. Verhandl. Berliner Anthrop. Gesellschaft. 1884. Pp. 2. Correspondenz-Blatt. June, 1884. Containing note on a Nephrite Axe, from Brazil.

From the AUTHOR.—Elmer R. Reynolds. Memoir on the Pre-Columbian shell-mounds at Newburg, Md., and the aboriginal shell-fields of the Potomac and the Wicomico rivers. Copenhagen. 1884. Pp. 22. From Proc. Cong. Amer. Copenhagen. 1883.]

From the AUTHOR.—Juan Ignacio de Armas. La Tabula de los Caribs. Estudios Americanistas, I. Habana. 1884. Pp. 31. [Read to the Soc. Anthrop. Havana.]

From the AUTHOR.—Protass Chandra Roy. The Mahabharata. Calcutta. Parts 9–11, inclusive.

From the AUTHOR.—A. B. Meyer. Ein Zweiter Rohnephritfund in Steiermark. Vienna. Pp. 12.

—— Uber Nephrite und ähnliches Material aus Alaska. Dresden. 1884. Pp. 21.

—— Ein neuer Fundort von Nephrit in Asien. Dresden. 1883. Pp. 10.

—— Ueber die namen Papúa, Dajak und Alfuren. Wien. 1882. Pp. 18.

—— Bemerkungen über Nephrit. Breslau. Dr. H. Traule. 1884. Pp. 1.

From the AUTHOR.—Henry Phillips. On a supposed Runic inscription at Farmouth, Nova Scotia. Philada. 1884. [From Proc. Am. Phil. Soc'y.]

From the AUTHOR.—Heinrich Fischer. Nephritfrage und submarginale (sub cutane) Durchbohrung von Steingeräthen. Berlin. 1884. Pp. 4. [Verhandl. Berliner Anthrop. Gesellschaft.]

From the AUTHOR.—C. C. Jones. The Life and Services of ex-Governor Charles Jones Jenkins. Memorial Address. Atlanta. 1884. Pp. 56.

From the AUTHOR.—G. A. Colini. Osservazioni etnografiche sui Givari. Rome. 1883. Pp. 47. [From Royal Lincean Acad.]

From the INSTITUTE.—Transactions of Vassar Brothers' Institute and its Scientific Section. Poughkeepsie, N. Y. 1883–84. Vol. 2. Pp. 166.

From the COMMISSION.—Bulletino della Commissione Archæologica Comunale di Roma. Rome. 1884. Pp. 138.

From the SOCIETY.—Boletino da Sociedade de Geographia de Lisboa. 1883. 4 ser. Nos. 8, 9.

From the COMMITTEE.—Mittheilungen des Komite der Geographischen Gesellschaft von Bern. Oct., 1883. Pp. 8.

From the SOCIETY.—VI. Jahresbericht der Geographischen Gesellschaft von Bern. 1883–84.

From the INSTITUTE.—Rep. of the Am. Archæol. Institute for 1884, at Boston. Cambridge. 1884.

From the COMPANY.—Bulletin of the Library Company of Philadelphia, for July, 1884.

From the SOCIETY.—Bulletins de la Société d'Anthropologie de Paris. Jan.–Mar., 1884.

—— Proc. and Coll. Wyoming Hist. and Geol. Soc'y, Wilkes-Barré, Pa. 1858–84.

—— The Manuscripts of the Earl of Ashburnham. (Remarks of American Newspapers.) 1884. Pp. 23.

From the INSTITUTE.—Bulletin of the Essex Institute. Vol. 15. Nos. 1–9, and Vol. 16, Nos. 1–6.

From the SOCIETY.—Bull. Société de Geographie de Paris. 1, 2, 3 Trimestre. 1884.

—— Compte rendu of the Society. Nos. 10–13, 15–17 of 1884.

—— Archivio per l'Anthropologia e la Etnologia. Firenze. 1884. XIV. Pt. 2.

—— Publications of the Imper. Russian Geograph. Soc. St. Petersburg. 1884. XX. Pts. 2, 4.

—— Report Imper. Russ. Geograph. Soc. for 1883. St. Petersburg, 1884.

—— Bollettino della Società Geografica Italiana. Roma. 1884. Pts. 1–7, 9–10, inclusive.

From the MUSEUM.—Sixteenth and Seventeenth Annual Report of the Peabody Museum. 1884. Vol. III. Nos. 3, 4.

On motion of Prof. WARD, the thanks of the Society was voted for these valuable documents.

Mr. W. H. HOLMES read a paper entitled "ORIGIN AND DEVELOPMENT OF FORM AND ORNAMENT IN CERAMIC ART."

ABSTRACT.

The material for this paper was derived chiefly from the native ceramic art of the United States. The advantages of this field, as compared with that of the classic Orient, is apparent when it is remembered that the dawn of that art lies hidden in impenetrable

shadow, while ours is in the light of the very present. The principles involved in this native art are applicable to all times and to all kinds of art, as they are based upon the laws of nature.

Ceramic art presents two classes of phenomena of importance in the study of the evolution of æsthetic culture. These relate, first, to form, and, second, to ornamentation.

Form in clay vessels embraces useful shapes, which may or may not be ornamental, and æsthetic shapes, which are ornamental and may be useful; also grotesque and fanciful shapes, that may or may not be either useful or ornamental. The shapes first assumed by vessels in clay depend upon the shape of the vessels employed at the time of the introduction of the art, and ornament is subject to similar laws.

Form may have three origins: First, adventition or accident; second, imitation of natural and artificial models; third, invention. In the early stages of art the suggestions of accident are often adopted by men, and are thus fruitful sources of improvements and progress. By such means the use of clay was discovered and the ceramic art came into existence. The accidental indentation of a mass of clay by the foot or hand, or by a fruit or stone, while serving as an auxiliary in some simple art, may have suggested the means of making a cup, the simplest form of a vessel.

In time the potter learned to copy both natural and artificial models with facility. The range of models is at first, however, very limited. The primitive artist does not proceed by methods identical with our own. He does not deliberately and freely examine all departments of nature or art and select for models those things most suitable to convenience or agreeable to fancy; neither does he experiment with the view of inventing new forms. What he attempts depends almost absolutely upon what happens to be suggested by preceding forms, and so narrow and so natural are the processes of his mind that, knowing his resources, it would be easy to closely predict his results.

The elements of ornamentation are derived chiefly from two sources—from the suggestions of incidents attending manufacture, and from objects, natural and artificial, associated with the arts. The first articles used by men in their simple arts have had in many cases decorative suggestions. Shells are exquisitely embellished with ribs, spines, nodes, and colors. The same is true to a somewhat limited extent of the hard cases of fruit, seeds, &c. These

decorative features, though not essential to the vessel, are nevertheless an inseparable part of it, and are cast or automatically copied by a very primitive people when similar articles are artificially produced. In this way a vessel acquires ornamental characters long before the workman learns to take pleasure in such details or conceives a desire beyond that of simple utility.

Artificial utensils have a still more decided influence upon ceramic decoration. The constructional features of textile vessels impress themselves upon the plastic clay in manufacture, and in time are repeated and copied for the pleasure they give. The simple ideas of embellishment thus acquired are constantly subject to modification. A single radical gives rise to a multitude of forms. The causes that tend to bring about these results are worthy of the closest study. They may be sought in the material, the form, and above all the constructional characters of the object decorated.

Prof. MASON followed Mr. Holmes with a short *résumé* of Prof. Hartt's theory of the rationale of ornament, published in the Popular Science Monthly, for January, 1884. Prof. Hartt maintains that the explanation of the shape and color of beautiful objects is to be found in the eye itself. We are pleased with certain lines because they bring the muscles of the eye into easy and healthful play.

Prof. MASON said that there was in his mind no conflict between the methods pursued in Mr. Holmes' paper and Hartt's theory—a little differently stated and expanded. Mr. Holmes traces the outline of that natural movement which aboriginal potters had followed. Hartt sought to show the subjective side and how it was that the primitive artist had chosen some forms and rejected others. If we will examine our own handwriting we shall find that the same two sets of facts present themselves. On the one hand we have books, papers, correspondence, copy-books, and many other printed and written things ever before our eyes. On the other hand there is the set of bones, muscles, and sinews, called the hand, with its great variety of lengths, thicknesses, flexibilities, so compounded in each as to give rise to a really individual hand. A man's handwriting is the movement of all these mobile parts in the lines of least resistance for each part, but always in the effort to conform to the pattern.

Now the natural world, with its shells, horns, gourds, carapaces, reeds; the mechanical world, with its shapes in hard material; the

curves and twists of spirals, cycloids, and circles innumerable, are all the patterns of things, the letters, the copy-book. The clay and the potters' tools are pen, ink, and paper. The lines of least resistance are partly in the hand of the potter, indeed, as Mr. Holmes has shown; they are partly in the muscles of the eye, as Mr. Hartt has said; but further back than all this is the force of usage and inherltance.

If we hang a hat intentionally on a peg eleven times, the twelfth time it will hang itself up. This is the universal and beneficent law of the passage of painful voluntariness into semi-automatism which follows the frequent repetition of any act whatsoever. We are pleased with certain muscular movements which have been oft repeated. There is no doubt, therefore, that the eye accustomed to certain outlines, the brain accustomed to certain consecutive impressions, are pleased with that which has become semi-automatic and habitual. We know that such tendencies are strengthened by inheritance, for we have here the application of a universal law of heredity.

Dr. FRANK BAKER said that Hartt seemed in some respects to ignore certain physiological laws in discussing the movements of the eye, and to have too little considered inventive geniuses. The source of art must be sought for in the brain that controls the eye; in the association of nerve cells that prompt the movement of muscles. Taste may follow and accept suggestions from natural forms, but art is not imitative, for, having its source in invention, it gives something nature does not.

Mr. FRANK H. CUSHING said that Hartt apparently did not try to ascertain what the eye might develop, but having certain forms at hand reasoned therefrom. The speaker had found in his studies of ceramic art in the southwest that decoration in basketry had long preceded that of pottery, and that the resulting forms might be generally attributed to adventition, and taste might have its principal source in the environment.

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EIGHTY-EIGHTH REGULAR MEETING, January 6, 1884.

Major J. W. Powell, President, in the Chair.

The Secretary of the Council made the following announcements:

The election of Dr. J. H. Yarnall, as an active member of

the Society; and George H. Black, Edinboro', Scotland, and Hermann Ten Kate, The Hague, Holland, as corresponding members.

Mr. H. N. BATES read a "Memorandum concerning certain Mounds in Pontotoc county, Mississippi," visited by J. M. Pollard, Esq., of Louisiana. No abstract.

Mr. O. T. MASON read a paper prepared by DANIEL G. BRINTON,

"ON THE PROBABLE NATIONALITY OF THE MOUND-BUILDERS."

Dr. Brinton said: Further reading on the subject, and also the observations during a trip made to the principal monuments in Ohio, have confirmed me in the opinion that we need not go any farther than the Southern tribes to find the modern representatives of the mound-builders. Since I wrote the article on the mound-builders, Mr. Horatio Hale has published his suggestive paper, in which he adds strength to this position by linguistic evidence.

It would probably be hasty to point to any one of the Southern tribes as being specifically the descendants of the nation who constructed the great works in the Scioto and Miami Valleys. The evidence is ample that nearly all the tribes of the Gulf States and Lower Mississippi were accustomed to throw up works of similar character and often greater magnitude. They were of radically diverse languages, but nearly in the same plane of culture. The Natchez, the Taensas, the Choctaws, the Creeks, the Cherokees, and others might put in equal claims. The last mentioned asserted that they once lived in the Upper Ohio Valley, and that they built the Grave Creek and other mounds, and they are borne out in such claims by various historic data.

With regard to the Shawnees, it has not been sufficiently recognized by writers that their name in the Algonkin dialects is not a national appellation, but a geographical term. It means simply "Southerners," and in its earliest employment bore no special reference to the tribe whom we call Shawnees. It first appears in a map drawn in 1614, intended to show the Dutch colony around New Amsterdam. In this the "Sawannew" are located as inhabiting the whole of Southern New Jersey; whereas the Shawnees, as we understand the term first came to the notice of the New York colony in 1692. On this map it simply means "Southern rivers" with reference to the position of New York harbor.

By dialect, tradition, and political affiliation the Shawnees were a northern tribe who moved south at no very remote period. Their language, according to the Moravian missionaries, was closer to the Mohegan than to the Delaware, Nanticoke, or other Southern Algonkin dialects. By tradition they at one time were a branch of the Mohegans on the Hudson, and it was to them that they returned when driven from their towns in Carolina and on the Tennessee river. The name of their principal clan, the Pequa or Pick-e-weu, is said by Heckewelder to be the same as that of the Pequods, of Connecticut, and he relates that the Mohegans told him that the two were of the same family.

If we can depend upon this evidence, and there is no reason why it should be rejected, the "Pre-historic Shawnees" are to be looked for in New York and New England. I have no idea whether this will correspond with Professor Thomas' views, but I should be gratified to hear that we had reached identical conclusions from independent study of the subject.

The four clans of the Shawnees were assembled in Ohio, but in Pennsylvania I have not found evidence of any but the Pequas, who lived in the valley that still bears their name in Lancaster county. Their state of culture was nowise ahead of that of the Delawares. They had one clan named Chilicothe, and three of their settlements in Ohio bore this name, but while there they had not the slightest knowledge or tradition about the ancient earthworks, as we are assured by the Rev. David Jones, who went out to teach them Christianity in 1772, and who, I think, is the earliest writer who calls attention to the remarkable remains in Southern Ohio.

Prof. CYRUS THOMAS read a paper entitled "Prehistoric Shawnes, from Mound Testimony."

Before reading his paper, Prof. THOMAS said, referring to the preceding paper, that he had recently written a letter with a view to procuring an exploration of Pontotoc county, Miss., without any positive knowledge that ancient remains existed there, and that the paper of Mr. Pollard was in verification of the speaker's assumption that such remains would be found in that vicinity.

Mr. C. C. ROYCE, at the request of the Society, read an extract from a former paper of his on the origin of the "Shawnees."

President POWELL said that the papers read before the Society during the past two years seemed to establish the fact that the

mound-builders were Indians, and that many Indians built mounds. While small burial mounds were frequent and widely distributed, the larger mounds and earthworks with circumvallation—once probably crowned with palisades—were confined to narrower limits. The old theory that attributed these remains to an extinct high grade of civilization seemed to be well nigh abandoned.

Dr. GREGORY said that he had held to the old theory until he had become convinced of its error, and described a large mound, some fifty feet high, that he visited in Minnesota, which gave conclusive evidence of its comparatively recent structure. Depressions were still to be seen close about the foot of the mound, from whence material had apparently been taken to aid in forming the mound.

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## SEVENTH ANNUAL AND EIGHTY-NINTH REGULAR MEETING, January 20, 1885.

Major J. W. POWELL, President, in the Chair.

The Secretary of the Council announced the election of John Addison Porter and H. L. Reynolds as active members of the Society, and advised the Society of the death of Dr. Henri Martin, of Paris, France, and Dr. R. J. Farquharson, of Des Moines, Iowa, corresponding members of the Society.

The Treasurer then submitted his annual report.

On the motion of Col. MALLERY, the President appointed Messrs. Bates, Baker, and Holmes a committee (composed of members outside the Council) to audit the accounts of the Treasurer.

This session being the time for the annual election of officers, the balloting for officers resulted as follows:

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| PRESIDENT | J. W. POWELL. |
| VICE-PRESIDENTS | ROBERT FLETCHER.<br>LESTER F. WARD.<br>GARRICK MALLERY.<br>OTIS T. MASON. |
| GENERAL SECRETARY | S. V. PROUDFIT. |
| SECRETARY TO THE COUNCIL | F. A. SEELY. |

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| TREASURER . . . . . | J. H. GORE. |
| CURATOR . . . . . | W. J. HOFFMAN. |
| ADDITIONAL MEMBERS OF THE COUNCIL | CYRUS THOMAS.<br>J. O. DORSEY.<br>W. H. HOLMES.<br>H. H. BATES.<br>FRANK BAKER.<br>DAVID HUTCHESON. |

The President announced that the next meeting would be public, to which the members of the Biological and Philosophical Societies were specially invited for the purpose of listening to the annual address of the President.

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NINETIETH REGULAR MEETING, February 3, 1885.

In accordance with previous announcement the Society assembled in public session to listen to the annual address of the President, there being present on special invitation the members of the Biological and Philosophical Societies and other friends of the Society.

Dr. J. C. WELLING introduced to the audience President J. W. POWELL, who delivered an address entitled "FROM SAVAGERY TO BARBARISM."

At the close of the address, on motion of Mr. MASON, a vote of thanks to the speaker was unanimously passed.

The Secretary of the Council announced that the Saturday course of lectures under the auspices of the Anthropological and Biological Societies had been arranged, and that programmes of the first part of the course were ready for distribution.

NINETY-FIRST REGULAR MEETING, February 17, 1885.

Prof. OTIS T. MASON, Vice President, in the Chair.

A report from the Curator was then read, including a list of publications received since his last report:

Bull. Library Co. Philada., No. 14. Jan., 1885.

Bol. Soc. Géog. Ital. Ser. II, Vol. IX, Fac. 12. Dec. '84, '85.

Mahabharata, Calcutta. Pt. XII, XIII.

Bul. Soc. Géog. de Paris. Vol. X, Tim. 4. 1884.

Compte Rendu, de la Soc. de Géog. de Paris. Nos. 18, 19.

Éléments d'Anthropologie. Par. Alphonse Cels. Bruxelles, vol. I, 1884. 8vo., pp. 202.

Les Habitans de Suriname. Prince Roland Bonaparte. Paris. 1884. Royal 4to , pp. 227, plt. 60.

Bull. Essex Institute. July–Dec., 1884.

Bull. Soc. d'Anthrop. Paris. Fasc. 2, 3. 1884.

Journal of Proc. of the Victoria Institute, London. XVIII, No. 70. 1884..

Grammaire Élémentaire. Quichée, L. Aleman. Pamph.

Quelques observations sur les ossements de notre musée. Maricourt et Vinet, Senlis, 1884.

Ymer. Parts 5, 6. 1884.

Bull. Soc. Géog. de Lyon. Sept.–Dec., 1884.

On the Cuspidiform Petroglyphs, etc. Dr. D. G. Brinton. Pamph.

Xinca Indians of Guatemala. " " "

Impressions of figures on a "Meday" stick. Dr. D. G. Brinton. Pamph.

Memoirs Soc. Antiq. de la Morinie, St. Omer. 1 Vol. 1883.

Bul. Russ. Géog. Soc. Also 2 pamphlets.

Mem. Soc. d'Hist., etc. Beaune. 1883.

Verein fur Erdkunde zu Halle a. S. Mittheilungen. 1884.

Imp. Soc. of the Friends of Nat. Hist. Anthrop. and Eth. Muscar. 3 vols. 1884.

Bull. Hungarian Geog. Soc. Budapest. Complete for 1884.

On motion of Prof. THOMAS, a vote of thanks was passed to the various authors and societies from which these gifts were received.

Mr BATES, from Auditing Committee, reported that the committee had duly examined the accounts of the Treasurer for the past year as reported at the annual meeting January 20, and had found the same correct.

Prof. WARD read a paper entitled "MORAL AND MATERIAL PROGRESS CONTRASTED."

One of the most obvious and frequently observed facts that lie upon the surface of modern society is the persistence of social evils in spite of the progress of discovery and invention brought about for the purpose of relieving them.

The actual removal of social evils constitutes moral progress; the discovery of principles and the invention of appliances calculated to remove them constitute material progress. It is these two forms of social progress which it is proposed to consider in this paper.

As to the degree to which moral progress has taken place and is taking place in society, there are wide differences of opinion. Some sanguine minds imagine it to be very rapid, but this is generally due to a confusion of unrelated phenomena. They either confound material with moral progress directly, or they confound the predominance of cherished religious beliefs with that of morality, or the establishment of favorite forms of government with that of justice and liberty. Others, and this is much the larger class, deny that any moral progress has ever taken place or is now taking place, and maintain, on the contrary, that there has been moral degeneracy, and that the world is growing constantly worse. In so far as these are merely influenced by the survival of a tradition very prevalent among early races they may, perhaps, be left out of the account. Many of them, however, disclaim such influence and base their convictions on the facts of history and the condition of society as it is. But such also must be set down as extremists, incapable of duly weighing the evidence from all sides of the question.

A highly respectable class, embracing many of the finest minds of the present period, see no hope except in the gradual change of the constitution of the human mind, to be brought about through hereditary influences and the slow developmental laws by which man has been at length raised above the brute. They deny the power of intelligence to improve the moral condition of society, and regard the ethical faculty as entirely distinct from the intellectual. "It is," said Mr. Herbert Spencer to an American reporter, "essentially a question of character, and only in a secondary degree a question of knowledge. But for the universal delusion about education as a panacea for political evils, this would

have been made sufficiently clear by the evidence daily disclosed in your papers." And in a private letter received after his return to England, relative to views which I had expressed, he re-asserts this doctrine, and says: "As you are probably aware, and as, in fact, I said very emphatically when in America, I regard social progress as mainly a question of character and not of knowledge or enlightenment."

In the light of all these somewhat conflicting opinions, if we were to rest the case altogether upon authority, we should at least be compelled to admit that the real moral progress of the world has been extremely slow, and that it is imperceptible even in the highest stages of enlightenment. Such, too, seems to be the lesson of history and of observation. It is only when we contemplate long periods of history and contrast the present or the recent past with the remote past that an advance can be perceived in the moral condition of mankind. Yet, when such an historic parallax is once secured, the fact that moral progress actually has taken place is distinctly seen. To read the history of England and compare the acts committed a few centuries ago by men of our own race, with what any one can see would be done now under like circumstances, is sufficient to demonstrate that improvement has been going on in both individual and public morals. Making every possible allowance for all that is bad in the present social system, no one could probably be found candidly to maintain that it is inferior, from the moral point of view, to that of the middle ages or even of the sixteenth century. Modern kings, bad as they are, no longer put their sons to death to prevent them from usurping their thrones, and the sons of kings, however profligate they may be, do not seek to dethrone their fathers. When Rome was at its zenith, it was no more than every one expected that the great armies of Cæsar and Pompey, on their triumphal return from victorious fields, would turn their arms upon each other for the mastery of the empire. And I have heard those familiar with Roman history predict, at the time when the vast armies of Grant and Sherman, far outnumbering the Roman legions, were marching victoriously through different parts of the South, that the last grand struggle of the war would be between the Army of the Cumberland and that of the Potomac—forgetting that since the age of the Cæsars there had been moral progress sufficient to render both the leaders and the soldiers incapable of such an act.

Political opponents are no longer beheaded on the accession of a new party to power; neither are they thrust into dungeons nor exiled, as formerly. Persecution for opinion's sake has practically ceased. Scientific men are no longer burned at the stake, like Bruno and Servetus, nor made to recant, like Galileo and Buffon. Witchcraft has dwindled into innocent palmistry, and heresy is only punished in a few backward communities by a mild form of social ostracism. Imprisonment for debt has been abolished, and the Fleet and the galleys are things of the past. Primogeniture and entail have disappeared from most codes of law, and trial by jury has been instituted in the most influential states. The slave trade has been suppressed wherever European powers have acquired supremacy, and slavery has been abolished in all the most enlightened countries. Vast public and private charities have been instituted, and societies for the prevention of cruelty to children and to animals receive the sanction of law. And finally a great moral crusade, with a display of far more zeal than knowledge, is being preached against the admitted evils of intemperance.

There has, then, been some moral progress within the historic period, but, considering the amount of moral agitation, it has been slight.

It is the characteristic of moral progress that it takes place rhythmically. In the achievement of moral reforms there are always experienced partial and temporary failures, prolonged interruptions, serious reverses, and constantly recurring waves of reaction, so that at no time has it been possible for the candid observer to perceive that any certain advance was being made. The ground continually being lost is never appreciably less then the ground gained, and none but the ignorant, the blinded, or the oversanguine see much cause for congratulation. In the great ocean of moral action so nearly equal are the tidal ebbs and flows that only the stoical philosopher whose vision ranges back into the remotest past or forward unto the remotest future, with utter contempt for the transient present, can perceive the minute increments of secular change—much as the geologist, provided with his vast time-measures, perceives the changes that are slowly taking place on the coasts of continents washed by the tides and waves of the apparently changeless ocean of waters.

Such is moral progress in society. With it we may now compare, or rather contrast, the other form of social progress which we have distinguished as material.

Material progress results entirely from mental and manual labor laid out on invention and construction. Moral progress is a product of *feeling*, material progress one of *thought;* the action accompanying the former is called *conduct*, that accompanying the latter is called *labor*. Conduct is confined to the avoidance of interference with liberty of action in others. Labor is directed to the production and distribution of the objects of desire. Moral action aims at the restraint or control of the forces of society, of human desires, prejudices, and passions. Invention and labor aim at the control and utilization of physical and mechanical forces, and of such vital processes as underlie pastoral and agricultural pursuits.

The contrast in the essential nature of these two classes of social phenomena is thus seen to be very wide, but it is not greater than is the difference in their mode of operating. We have seen that moral progress always takes place by rhythmic action, and that its secular slowness is not due to its own inherent sluggishness, but to the fact that only the algebraic sum, of its many fluxes and refluxes can be counted. In material development nothing of the kind is found. Every step is a permanent gain. Every mechanical invention is an inalienable contribution to the material prosperity of society. If the particular device first produced becomes at length obsolete, as is usually the case, it is only because from it as a basis better devices, involving additional principles and doing more efficient service, have grown up. And such, in fact, is the nature of all inventions.

But the machine is only the material embodiment of intellectual conceptions, and it is these that lie at the foundation of all material progress. Indeed, much of this progress has consisted of such conceptions without any definite materialization. Of this class is all real knowledge of nature, only part of which can be directly applied to man's material amelioration. Every natural truth acquired proves advantageous, and the progress of pure science, like the progress of invention, has been steady though not uniform, never intermittent nor ryhthmical. The misguided forces of feeling which underlie the fluctuating moral activities of society have often resisted the progress of science, have seriously checked it, sometimes apparently arrested it during long periods, but they have never succeeded in forcing it backwards. The same is true of art, especially of practical or useful art. This fact is strikingly exemplified in the interest attaching to the few alleged "lost arts", as though

it were next to impossible for a single art to be wholly lost. And so it is. Every age has known all that was known by the age that preceded it and has added something to this. Every age has possessed all the arts of the age that preceded it, and has added something to them. And this in spite of the most prolonged moral reactions, such, for example, as that of the middle ages.

If we examine the arts, implements, utensils, and weapons of any of the lower tribes, as, for example, the Esquimaux of the extreme north, we shall find that they represent a high degree of skill, a large amount of inventive thought, and a considerable real knowledge of the laws of nature and of physical forces. A comparison of many such tribes also shows that these devices represent, like those of the most enlightened peoples, a series of steps in invention answering to our improvements. But a better implement is never abandoned for a poorer one, and here, as in the higher races, progress has been constant—always forward. We may therefore safely conclude that the present high state of material advancement in scientific nations is the result of a series of intellectual conceptions materially embodied in art, stretching back into that dim past when the club embodied the highest mechanical principles known to man.

Such is material progress, and such are the essential particulars in which it so widely differs in nature and method from moral progress. But, great as these differences seem and are, there is a point toward which they may be made, hypothetically at least, to converge. This point is where the human activities are conceived as natural phenomena, and their control through the normal inventive process is contemplated as a true art. If the power to do this shall ever be attained, there is no reason why morals may not progress in the same manner and at the same rate as material civilization. The true interpreters of human history now understand that it is to material progress, *i. e.*, to science and art, that what moral progress has actually taken place is indirectly due. It is knowledge of the universe enlarging the mental horizon that has dispelled the bigotry of pre-scientific ages and thrown the mantle of charity over individual conduct and opinion. And it is the arts of intercommunication that have really civilized the modern world, as compared with the world before their introduction.

But since morals, from the point of view of social science, are concerned exclusively with the welfare of men, and since material progress, both physical and intellectual, is also directed exclusively

toward this same end, the question naturally arises, why does not the welfare of men advance *pari passu* with the progress of science and art? As already remarked, no thoughtful person will maintain that it does so advance, some insisting that the two are wholly independent, and others claiming that the moral condition of society is degenerating in spite of the brilliant material civilization of these later times. After conceding all that is possible on the side of a real moral progress in society the case is bad enough, and the blunt comment of crude common sense naturally and properly is, of what use are science and art if they are incompetent to add anything to the general welfare of mankind? And to this question the response of the highest science is that if they cannot do this they are of *no* use. The welfare of mankind is the ultimate test of utility, and whatever fails to withstand that test stands condemned.

But admitting, as has already been done, that all the perceptible moral progress that has taken place has been due to that of intelligence in interaction with the practical arts which it necessarily creates, it may still be a question whether this trifling result is really worth the Titanic efforts which this teeming age puts forth. The attempt to answer this question would probably be attended with insuperable difficulties and need not be made. It will be more profitable to consider the far more important one whether, in the nature of things, this admitted slight influence of material upon moral progress could, even theoretically, be so far increased as to render them somewhat proportional in amount.

Moral progress may be defined as embracing all those changes in man's social condition which actually enhance his general well-being; material progress may be defined as embracing those changes which give him power, if judiciously employed, to improve his condition, without implying such employment. If these definitions are correct, it is evident that all that is needed to make moral progress depend quantitatively upon material progress is to secure the judicious employment of the modifications of crude nature which are produced by human thought and action. Knowledge, ingenuity, skill, and industry need to be applied to moral ends and directed to the attainment of the social well-being. At present science and art are only potential factors in civilization. The need is that they be converted into actual factors. They are well nigh omnipotent in the accomplishment of anything toward which they can be once

fairly directed. The difficulty is entirely that of securing for them the opportunity for free action. The power, for example, to produce a large quantity of a useful commodity may exist, but the conditions be wanting for placing the product in the hands of those who want it. This checks the production without affecting the producing power. That lies latent, and such latent power is simply wasted. Nor is it altogether a discrepancy between production and distribution. The power to distribute exists as well as the power to produce, but the conditions are wanting which are necessary to call that power into exercise. And this is the actual industrial state of society.

What is true of art is true of science. Intelligence, far more than necessity, is the mother of invention, and the influence of knowledge as a social factor, like that of wealth, is proportional to the extent of its distribution.

Society has always presented to the thoughtful student two great inequalities as the adequate explanation of nearly all its evils—inequality of knowledge and inequality of possession. Moral progress, in so far as it has taken place at all, has consisted in the slight diminution of one or both of these inequalities. This is always accomplished by the adoption of a better system of distribution. These two commodities, information and possession, differ in the essential particular that the latter is and the former is not destroyed in consumption. The existence of a supply of knowledge for distribution is therefore proved by the very fact of its inequality. But there is a sense in which the supply of wealth for distribution is also practically unlimited. Production never ceases from having reached a limit to the power to produce. It always ceases from having exceeded the power of the community to consume. But the limit of consumption is in turn never that of the desire to consume; it is always that of the power to obtain. The power of both production and consumption is limited only by that of distribution—not the mechanical means of distribution, for these, too, are unlimited, but the conditions to the performance of the sociological function of distribution. Could the distribution of knowledge and of physical necessities go on at a rate at all proportional to their possible creation, the moral progress of society, *i. e.*, the increase in its aggregate well-being or enjoyment, would not only be as rapid, but would also be as uniform and steady as its material progress. If the knowledge now in possession of the few were in the possession of all, its

benefits would be far more than proportional to its universality, since inequality itself often renders knowledge positively injurious. Although it be true that if the actual wealth of the world were equally distributed the share of each individual would be a very small fortune, yet if the limitations to possible distribution were removed production would so far increase that almost any desired portion might fall to each and all.

Wherein, then, consists this mysterious yet potent barrier to the distribution of wealth and wisdom: this practically prohibitory tariff upon the world's commerce in both thoughts and things?

The answer is rather deep than difficult. The two processes as they go on in society belong to antithetically opposite categories of social phenomena. We have in them the ultimate kernel of that broad contrast which has just been drawn between moral and material progress. It is the great distinction between natural and artificial processes, between genetic and teleologic activity, between growth and manufacture, between the method by which feeling works and that by which intellect works. The former is a method of direct effort, and fails in the great majority of cases to attain its end because of obstacles which are never taken into account. The latter is a method of indirect calculation by which the obstacles are foreseen, and in one way or another provided against before the advance is attempted. Hence it is always successful if the phenomena and laws to be dealt with are really understood. This is why science and art, as already stated, move ever forward, never backward. The discovery of truth on the one hand, and the invention of artificial appliances on the other, are always going on, multiplying the power of man to produce and distribute the objects of desire. Of the gain thus made nothing is ever lost. But when we come to the actual utilization of the products of discovery, invention, and handicraft, we find this under the control of the opposite class of forces. The power to produce either knowledge or wealth is controlled by man, exercised when it can serve his purposes, checked or arrested when it no longer does this. But the power to possess—the ability to obtain the truth discovered or the commodity wrought—is controlled by natural laws and depends upon the thousand accidents of life—the conflicting wills of men, the passions of avarice and ambition, the vicissitudes of fortune, the uncertainties of climate and seasons, the circumstances of birth and social station, the interests and caprices of nations and rulers. Of what use is discov-

ered truth to the millions whose minds it can never reach? Why produce useful commodities which those who need them are unable to obtain? For while all producers are also consumers, and nearly all consumers are at the same time producers, yet few can satisfy their wants, however capable they may be of producing an equivalent in value of other forms. Inventions in the practical arts by which the power is acquired to multiply the products of labor, instead of working the rapid amelioration of the laboring classes, actually injure their prospects by throwing skilled artisans out of employment; and instead of resulting in greatly increased production they do not appreciably affect production, but reduce the amount of labor to the disadvantage of the laborer. The plea of over-production in periods of financial depression is the sheerest mockery, since it is just at such times that the greatest want is felt. It may be true that more is produced than the consumers can obtain, but far less is produced at all times than they actually need and are able to render a full equivalent for. The eager manner in which every demand for laborers is responded to sufficiently proves this. It proves also that the industrial system is out of order, and that we live in a pathological state of society. The vast accumulations of goods at the mills avail nothing to the half-clad men and women who are shivering by thousands in the streets while vainly watching for an opportunity to earn the wherewithal to be clothed. The storehouse of grain held by the speculator against a rise in prices has no value to the famished communities who would gladly pay for it in value of some form.

Yet in all this the fault cannot fairly be said to lie with individuals nor with corporations, with manufacturer nor merchant, with producer nor consumer. These do but act the nature with which they are endowed. This defective circulation of industrial products is the result of the state of society. It is in one sense normal, since it is due to the operation of natural laws governing social phenomena. The enormous inequalities of both the classes named and the evils resulting, constituting the major part of the woes of mankind, are simply due to the fact that the agencies for distributing knowledge and wealth are *free* in the politico-economic sense, *i. e.*, not regulated nor controlled by intelligent foresight. The contrast between moral and material progress is the contrast between Nature and Art. Nature is free. Art is caged. The forces of Nature play unbridled among themselves, until choked by

their mutual friction, they are equilibrated and come to rest. Art commands them with tones of authority to pursue paths selected by intelligence and thus indefinitely to continue to exert their power. Under the dominion of Science, *i. e.*, under the intelligent control of physical forces, man's power to create the objects of desire and to send them where he will, is practically unlimited. But under the dominion of Nature, *i. e.*, under the free operation of the social forces, as yet beyond the reach of science, these objects of human necessity in seeking unaided their proper destination conflict perpetually in their passage, dashing against unseen obstructions, forcing themselves into inextricable entanglements, polarizing themselves around powerful centers of attraction, heaping themselves up in inaccessible "corners," or flying off on tangential lines to be lost forever.

This is what in modern phrase is very properly denominated the "waste of competition." But it is far more than the mere waste of the wealth produced. It is the paralysis of the strong hands of science and art as they co-operate with labor in the creation of value. It is the stubborn, the protracted resistance which the moral forces of society offer to its material as well as to its moral progress.

The statement of the problem is its theoretical solution, which can be nothing less than the conquest by science of the domain of the social as it has conquered that of the physical forces.

But alas! how wide is the difference between the theoretical and the practical solution of a problem to the bare statement of which the foremost thinkers of the age are as yet unwilling to listen.

## DISCUSSION.

The paper was discussed at length by Messrs. Powell, Welling, Thomas, Baker, Peters, Hart, and Ward.

Major POWELL maintained that there had been much moral progress, and gave numerous illustrations of this among uncivilized races. He said that some of these races had elaborate codes of morals often worthy of imitation by civilized races, and that the work of devising means of preventing and terminating controversy and securing justice had engrossed the energies of all people from time immemorial, that it had been largely successful, and had resulted in great moral progress, as great as, or even greater, than the material progress achieved by such races..

Mr. WELLING, after paying a high tribute to Mr. Ward's paper, expressed the opinion that the complaint which it formulated, based on the assumed failure of moral progress to keep pace with material progress, was in itself the mark and the expression of growing moral aspirations, seeking more and more to realize themselves in the figure of society. It is a sign of intellectual growth when an age is working vehemently on unsolved problems along the converging lines of scientific inquiry; and it is an augury of moral progress when an age has become impatient of existing social adjustments in their relation to public well-being, and is longing for a better co-ordination of social relations and a better distribution of social advantages. The unrest of such an epoch, he said, is the unrest incidental to all transition periods, and is a ground of congratulation rather than a source of lamentation. It is necessary that social wants and moral aspirations shall be distinctly articulated before they can be properly embodied in institutions or in regulations; and this embodiment must needs be a slow process under the formula of social evolution, because social experiments are experiments made on the grandest of all living organisms—the body politic—and not *in corpore vili*.

Nor is it enough that the co-ordination of society should be directed by the highest intelligence of the community, if that intelligence be congested in the head of the social organism. It is so in China to-day, and has there resulted in a stationary civilization. It had been so in the feudal system of the middle ages, and had there resulted in a cast-iron polity destructive of moral progress and of social well-being, until that cast-iron polity had been broken by the expansive force of a larger and more complex social life permeating the lower members of the body politic. True moral progress can take place only in a social organism which is "vital in every part," for here the actions, reactions, and interactions of public opinions give the widest possible distribution to social thoughts, feelings, purposes, and aspirations. It is in such an organism that "discussion becomes the mould of measures," to use the fine phrase of Thucydides, and that the lines of safe social change can be soonest discovered and soonest followed. In such a community there will be a growing complexity and a growing difficulty in the problems to be solved by each generation, but the problems will not increase in difficulty or number beyond the growing resources of civilization for coping with them. He illustrated

this point by citing the new and difficult social problems created by the abolition of slavery, and by the removal of governmental restrictions on the freedom of industry.

Dr. BAKER said that in estimating progress in the domain of morals we should be careful to consider the average state throughout a sufficiently wide area. Comparing the present state of the civilized world with that of ancient Greece and Rome, we do not at first see such a marked advance, but it should be remembered that at the time of Socrates and Seneca the greater part of Europe was living in a state of low barbarism, comparable to that of nomadic savage tribes, preying on each other like hawks and falcons, and it was not until after the Norman Conquest that life and property in the northern part of Europe were safe from ruthless marauders and sea-robbers. Respect for abstract right and justice were matters of late growth, clearly recognized, it is true, by the Greeks and Romans, especially by the latter.

We may be in error in estimating the state of morals in any ancient nation, for we know that it is extremely difficult to correctly estimate our contemporaries. Thousands of Englishmen suppose to day that our late civil war was a mere struggle for supremacy, a conflict for territory, and it seems hopeless for an American to understand French politics or French morality. According to the average French novel, infidelity to marital relations is the rule, yet all who have had access to French households agree that in no country are the family habits more sweet, affectionate, and fixed. I am sure that we would err grievously to take our view of French morals from Zola, Balzac, or Sue. In reading Plato I have been startled at the mention of certain habits and practices in such a connection as to show that they were not regarded by the author as at all objectionable, practices which would to-day be considered infamous. The collection at the Museo Borbonico at Naples, contains many articles of personal adornment and public exhibition from Pompeii which are so shocking to our ideas that they are not shown to the general public, and Terence, Plautus, Juvenal, and Rabelais abound in passages which show that they addressed an audience to whom gross and lascivious ideas gave a pleasure which to-day is usually replaced by disgust. Indeed this attitude of mind was so common that even the purest Greek and Roman authors are now read in our schools with expurgated editions.

It seems to me clear that a certain unwritten code of morals not

always easily defined has been growing throughout the historical period with a steady progress on the whole. I refer to that code which has for its basis the criticism of our fellows, and which we call the morals and manners of a gentleman. Obscured by many absurd and trivial details as to what clothing we shall wear and what corner of our cards we shall turn down, it has yet a very substantial moral basis, and there are evident signs of its advance. Time was when it was not considered necessary to adhere closely to the truth, and when the seduction of young girls was considered an accomplishment. Our grandfathers reverenced a five-bottle man while we look rather askance at one who "tarrieth long at the wine." I believe that never in the world has the standard of clean, healthy morality been as high as to-day, although I am aware that the eager scramble for money perverts and injures many features of the fair ideal.

We do not always completely realize the Titanic task which this wonderful teeming nineteenth century has before it. The civilization of the past had for its object the training and enlightenment of the few; we are apt to judge of it by its results upon that few, and forget the countless miserable hordes of slaves and plebes that were little above cattle, and whose morals no one noted. These formed the armies that sacked and burned conquered cities, a proceeding that was once a matter of course, performing deeds of lust and rapine that are almost impossible to realize. The task to-day is to civilize *all*, to give to all the opportunity to live healthful, active, lives of usefulness and enjoyment. It will take long, and we are in the throes of the conflict. Of all biological processes those that bring the passions under control are the slowest. The African whose grandfather was a cannibal will not at once conform to the moral attitude of the descendants of a long line of civilized ancestry, however he may seem to do so.

On the other hand, I cannot but note that any stride in material progress must ameliorate the general condition, and so foster moral progress. That morality has something to do with food supply is evident to us all, and it is a matter of daily observation that one is more ready to do a good deed after breakfast. The poor half-starved Irish peasant ready to shoot his landlord on trifling provocation is transformed in the course of a generation to a jovial, hard-working, and tolerably law-abiding citizen when transferred to a more genial environment.

Mr. E. T. PETERS said he had been deeply interested in listening to the paper read by Prof. Ward. He thought that in some of the comments made in the course of the discussion it had been assumed that the term moral progress, as used in the paper, referred to improvement in public morals; but, as the essayist had defined it, it embraced not only this but everything else which advanced the happiness of man. The lack of progress which had been chiefly dwelt upon in the paper just read seemed to him to consist mainly in the tardy advance of political and social science. Between this and the marvelous advances which in modern times had been made in the physical sciences and in their application to the arts of life there was indeed, a striking contrast. Referring to a remark which Major Powell had made as to the necessity for new adjustments in social organization arising from changes in the material conditions under which a society existed, the speaker said, that was a pregnant thought. The changes of condition brought about within the last one hundred years through the introduction of labor-saving devices into the industries of the civilized world had alone amounted to an economic revolution, and a need had thus been created for changes correspondingly great in the social adjustments which relate to the production and distribution of wealth. The knowledge essential to the making of such changes as the best interests of society required had, however, not been in existence, and although vast social changes had occurred, they had come about not in pursuance of any wise and comprehensive plan, but through the blindly exerted pressure of changing circumstances, and in a large part they had been productive of great social misery and discontent. To take a single illustration, the introduction of the new industrial methods had given a powerful impetus to the growth of towns and cities, causing them to spread over large areas of suburban land, or to rise up on land where none had stood before. This had operated to the great enrichment of a few land-owners, at the expense of crushing rents and ruinous over-crowding to the poorer portions of the urban population. Society had no interest in this enrichment of a few land-owners, because it had occurred independent of the exercise on their part of any of those economic or social virtues which it is the policy of society to encourage; while on the other hand the most imperious considerations of public policy had demanded that the correlative over-crowding of the poor—unwholesome no less from a moral than a physical

point of view, and tending to rapid social deterioration—should if possible have been prevented. A social adjustment adapted to that purpose might have been found in a land tax like that suggested by a very eminent English economist, the late John Stuart Mill, namely, a tax which as nearly as practicable should appropriate for public purposes the whole unearned increase in the rental value of land. But Mr. Mill's suggestion had not been made until about fifteen years ago, and the advanced public opinion necessary to the adoption of a plan involving some such principle did not exist even yet. That the situation created by the want of social and political adjustments adapted to modern industrial conditions was a very serious one was apparent from indications that might be seen on every hand. To close the great gap between social and physical science—between moral progress as defined in the paper just read and material progress as illustrated in the stupendous achievements of modern industrial art—was in the speaker's opinion the crying need of the time, and unless this need were supplied there would be imminent danger of a social catastrophe. In order that it might be supplied it was necessary that social questions should receive attention to a vastly increased extent. In particular should the most serious and unprejudiced consideration be given to the manifestations of discontent that came from the working people of every civilized nation. If they were not proposing the best remedies for the evils they complained of, so much the greater was the need that the deep sociological problems involved should be taken up in earnest by those who had more time and a better intellectual equipment for their study; and they must be taken up, not as it was to be feared they had been by some men rated high as political economists, namely, in the spirit of an advocate retained for the defense of the existing state of things—but in the pure spirit of the man of science, ready to follow where the truth should lead, however great and radical the social changes which might be involved in doing so.

There were very influential writers who would have us believe that the discontent of the poorer classes had no foundation unless it were in the mischievous meddling of governments with the natural course of affairs. The speaker believed that we should come much nearer the truth if we accepted the views advanced in the paper under discussion, which were directly the reverse of that just indicated, recognizing the necessity of social coördinations to which

only governmental agencies could be adequate. There was doubtless a field for legislative action in the repeal of bad existing laws, but there was a still wider one in the enactment of good ones adapted to the needs of soeiety.

Mr. WARD, in reply to numerous inquiries and objections made during the discussion of the paper, explained that for the sake of brevity he had omitted any precise definition of the term Moral Progress as used in the paper. He said that the term was often employed in two quite distinct senses, and that much of the discussion had considered it in the other sense from that clearly implied in the paper. There is a subjective sense which relates to individual character and an objective sense which relates to collective well-being. The paper did not pretend to discuss the question whether human character had advanced, or how much it had advanced. It aimed only to consider the relation of material civilization to social well-being, the sole test of moral progress in this objective sense being the condition attained with respect to the enjoyment of life. This progress might be either positive, consisting in an increase in the pleasures of life; or it might be negative, and consist in the reduction of the pains of life. In fact this negative progress has been by far the most observable, the chief improvement in man's condition thus far being some slight mitigation of the evils of existence. In view of this criterion of moral progress as measured by the degree of collective happiness, all that had been said respecting higher standards of taste in literature and social life was irrelevant to the discussion, since it simply confounded refinement with enjoyment, which are two entirely distinct things. Admitting that finer sensibilities are capable of higher enjoyment, this is far from proving that they necessarily enjoy more, for they are also capable of more acute suffering, and the whole question originally was whether material civilization prevents more of the latter than it occasions.

Mr. WARD in conclusion expressed surprise that Dr. Welling should have seemed to regard his paper at all in the light of a jeremiad. On the contrary, he tried to take such a view of the future as should be philosophic rather than either pessimistic or optimistic, but had sometimes been accused of expecting results that were not likely to be soon realized.

NINETY-SECOND REGULAR MEETING, March 3, 1885.

Major J. W. POWELL, the President, in the Chair.

The Secretary being absent the minutes were not read. The President announced that on account of the small attendance the Council had thought best to defer the regular program till another meeting, and that a portion of the time would be occupied by himself. He then addressed the Society upon Patriarchy, and the conditions of savage society which preceded and led to it.

He was followed by Mr. Cushing in some remarks upon artificial age and parentage among the Zuñis, illustrated by his own experience.

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NINETY-THIRD REGULAR MEETING, March 17th, 1885.

Major J. W. POWELL, President, in the Chair.

The Secretary of the Council announced the election of Prof. W. C. Kerr, of Raleigh, N. C., as a corresponding member, and Mr. E. R. L. Gould, of Washington, D. C., as an active member of the Society.

The following papers were then read:

"STUDY OF THE CIRCULAR ROOMS IN THE ANCIENT PUEBLOS," by Mr. VICTOR MINDELEFF.

"CIRCULAR ARCHITECTURE AMONG THE ANCIENT PERUVIANS," by Mr. W. H. HOLMES.

DISCUSSION.

Prof. MASON. A very interesting separation has been made by the speakers of the evening without design. The subject for discussion is "Circular Architecture of the American Aborigines." Now in discus ing this theme we may have regard either to structure or function. If Mr. Turner had not been called away he would have told us of the Eskimo *igloo*, or winter temporary hut of ice or snow; Mr. Mindeleff described at length the circular rooms in the pueblo structures of our southwest territory, and Mr. Holmes has dwelt upon the chulpas. Structurally we have the material at hand

wrought into the most natural shape for a cist or cell, the most simple being that of the Eskimo, the most complex, the chulpa of dressed stone. Now as to function, they differ very curiously, the igloo teems with daily life, the estufa is open to ceremony and conventions, the chulpa is a sealed tomb. The Eskimo has a council chamber, a place of public meeting in the permanent undergound dwelling. The Chibchas and Peruvians had both dwelling and meeting places apart. Descending the continent from north to south it is curious to notice the transfer of function in circular architecture from dwelling place to meeting place, from meeting place to tomb.

Mr. Arthur Mitchell, in his admirable work, "The Past in the Present," has shown us how old arts degenerate as new arts arise. The reason is not far to seek. When our Indians were brought face to face with the civilization of the whites, the bright, intelligent, susceptible individuals and tribes dropped at once their old arts and took on the new. The old, the dull, the conservative clung to former things, which degenerated in their hands. On the whole there was progress, but many things in the onward mass were moving backward.

So it is with civilization at large—families, gentes, tribes—whole nations and races disappear; but new and better families—gentes, tribes, nations, and races take their places.

Mr. J. H. Blodgett said the remarks as to a sinking class of persons in this city and elsewhere, call to mind an investigation carefully made and recorded about 1810 in the city of Glasgow in connection with some of the benevolent operations of the Church of Scotland.

The classification then made was in these four groups: 1. A wealthy class, able to select and carry out their own plans of life in the main independently—one-sixth of the people. 2. An uprising class, struggling for better advantages for themselves and their children—one-third of the people. 3. A sinking class, tending downward except for helpful influences brought to bear on them by others—one-third of the people. 4. A sunken class, confirmed criminals and paupers—one-sixth of the people. Such investigations have a bearing upon discussions such as that of the Society recently upon our relative moral and physical progress.

NINETY-FOURTH REGULAR MEETING, April 7, 1885.

Major J. W. POWELL, President, in the Chair.

Dr. WASHINGTON MATTHEWS, U. S. A., read a paper entitled, "MYTHOLOGICAL DRY-PAINTING OF THE NAVAJOS."

ABSTRACT.

These are pictures of large size (10 to 12 feet in diameter) drawn in powdered substances on the sanded floors of the medicine lodges of the Navajo Indians of New Mexico and Arizona. They represent various gods and other mythical conceptions of this tribe. The pigments used are five in number: white, made of powdered white sandstone; yellow, of yellow sandstone; red, of red sandstone; black, of charcoal; and a so-called blue—but really a gray—of black and white mixed in proper proportions. To apply them the artist grasps a little in his hand and allows it to flow out between the thumb and the opposed fingers. When he makes a mistake he does not brush away the color, he obliterates it by pouring sand on it, and then draws the corrected design on the new surface.

The drawings are begun as much towards the center as the nature of the picture will permit, due regard being paid to the precedence of the points of the compass, *i. e.*, the figure of the god in the east is begun first; that in the south, second; that in the west, third; that in the north, fourth. While the work is in progress the chief shaman does little more than direct and criticise; a dozen or more young men, who have been initiated into the mysteries, perform the manual labor. The pictures are drawn in accordance with established rules, except in certain well-defined cases where the painter is allowed to indulge his fancy. This is the case with the embroidered pouches, which the gods are represented as carrying. On the other hand some parts are measured by palms and spans, and not a line of the sacred design can be varied in them. Straight and parallel lines are drawn on a tightened cord. The naked forms of the mythical persons are first drawn, then the clothing is put on.

When the picture is finished it is the duty of the shaman to put corn-pollen on the lips and breast of each divine form and to set certain plumed wands around the picture. Then the sick person for whose benefit the whole ceremony is performed enters and has the colored dust from various parts of the pictured forms applied to

corresponding parts of his person to remove disease, and to have many other rites performed over him. When the patient has departed many of the spectators pick up and preserve the sacred corn-pollen. Some take dust from the figures on their moistened palms and rub it over their own bodies. Then the shaman obliterates the picture with a slender wand while he sings a song appropriate to this part of the ceremony. Lastly, the assistants gather the sand in their blankets, carry it to a distance from the lodge and throw it away. Thus in half an hour from the completion of the picture not a trace of it is left.

The lecturer has heard of seventeen great ceremonies of the Navajos in which pictures of this character are drawn. There are about four pictures to each ceremony—only one picture being painted in a day—and besides these great ceremonies there are minor rites with their appropriate pictures, smaller and less elaborate. The medicine men aver that these pictures of the great ceremonies are transmitted unaltered from year to year, and from generation to generation. This is doubtful, as no permanent design is preserved for reference and there is no final authority in the tribe. Furthermore, as the majority of the rites can be performed only in the season when the snakes hibernate, the pictures are carried from winter to winter in the fallible memories of men. It is probable, however, that innovations are unintentional and that changes are wrought slowly.

The lecture was illustrated with seven large charts, representing some of the pictures which the lecturer had seen. Of their meaning and symbolism there was given a full explanation, which included the description of many of the rites and the narration of many of the myths and traditions of the tribe.*

Following this paper Prof. Gilbert Thompson presented sketches of rude drawings, seen by him in a cave at San Antonio Springs, N. M. The walls of the cave were smoke-covered, but the drawings were distinct and plainly marked, etched in the stone surface and brought out with various colored pigments. Certain points of resemblance were indicated between these figures and some described by Dr. Matthews.

*A more extensive abstract appears in the "American Naturalist" for October, 1885.

DISCUSSION.

Mr. DORSEY said, referring to the mystic qualities attributed to the number four among the Navajos, that among the northern Athabascans the number five held the place accorded to four by the Indians of the Missouri river and Southwest.

Maj. POWELL said that great elaboration was to be observed in the myths of the North American Indian. The speaker at one time witnessed a ceremony in a Moqui village that lasted four days, including one day of feasting. A constant succession of nude figures with highly colored faces formed a marked feature of all the ceremonies. He saw different colored sands, meal, corn, and pebbles used in many ways in connection with the incantations of the Shaman, which were performed, as the speaker believed, to the end that rain and abundant crops might follow. The falling rain was represented by sprinkling the floor of the estufa. Among the Utes and Shoshones fully one-half of the nights, during six months of the year, is taken up with ceremonial gatherings and the relation of myths.

Col. MALLERY said that he found in Thomas V. Keam's Catalogue of Relics of the Ancient Builders of the Southwest Table Lands, a somewhat different arrangement of colors in symbolizing the cardinal points from that observed by Dr. Matthews: White, signified north; yellow, the east; red, the south; and blue, the west.

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NINETY-FIFTH REGULAR MEETING, April 21, 1885.

Major J. W. POWELL, President, in the Chair.

The Secretary of the Council announced the election of Prof. A. H. Thompson, of the Geological Survey, and Mr. Charles N. Adams, of the Civil Service Commission, as active members of the Society; and informed the Society of the death of Dr. Harrison Wright, on February 20, 1885, at Wilkes Barre, Pa., and Col. P. W. Norris, on Jan. 14, 1885, at Rockland, Ky., corresponding members of the Society. Appropriate remarks upon the death of Col. Norris were made by President Powell, followed by Col. Mallery, who delivered a brief eulogy upon Dr. Wright.

Mr. H. W. Henshaw read a paper entitled "Medicine Stones."*

DISCUSSION.

Col. Mallery, referring to the evidence presented in the paper, that the objects generally classed as sinkers were used as ceremonial stones and amulets, remarked that amulets and fetiches had often been adopted from utensils and objects connected with daily life. He gave instances specially connected with the fish—commonly appearing towards the third century as an emblem of Christ, but derived from the worship of the Phœnician Dagon, and found still more anciently in Egypt, Nineveh, and India, with some relation to the productive powers of nature. The lingom stones were mentioned in this connection, also the bulla and the form called from its shape vesica (bladder) suspended to the necks of Roman boys, which was succeeded by the *Agnus Dei*, used in the same manner. Without attempting to trace an immediate association between these objects and those presented by Mr. Henshaw, his views are corroborated by the fact that stones similar in shape and size have been employed from high antiquity in many parts of the world for superstitious purposes, and that therefore it is unphilosophical to insist upon their exclusive design for mechanical or industrial uses among the tribes of North America, which are known to have universally been addicted to amuletism. Without any elaboration of symbolism the selection of the form might readily have been derived from the idea of "luck" connected with sinkers used on some special occasions.

Mr. Dorsey, referring to what Mr. Henshaw had said about the "Medicine Stones" and the down from the breast of a white goose, remarked that he had noticed among the Omahas, Kansas, and cognate tribes, some of the uses of this down from the white goose, and that in the gens or clan of the Earth-lodge Makers in the Omaha and Kansas tribes there were "White Goose (or Swan) people." In the Omaha gens referred to there are also Keepers of the Sacred Stones (or Mysterious Stones.)

He then gave a part of the traditon of the Sacred Pipes to the Omaha gentes: "The Earth-lodge people were visited by the seven old men bearing the pipes. When the gentes were finally organized half of these people were bad, and half were good. The

* Published in American Journal of Archæology. I. Pp. 105–114.

bad ones had some stones at the front of their lodge, and they colored them as well as their own hair, orange-red (zhee.) They wore the down of the white goose (or swan) in their hair, and branches of cedar around their heads, being frightful to behold. So the old men passed to the good ones, to whom they gave one of the pipes." According to Joseph La Fleche and Two Crows, there are four of the sacred stones, their colors being black, red, yellow, and blue. (One tradition is that the stones were made by the Coyote in ancient times, to be used for conjuring enemies.) In the Osage tradition, the four kinds of stone found at the first, were white, black, red, and blue (or green.)

In reply to a question put by the President, Mr. Dorsey said that among the Dakotas, Ponkas, and other related tribes, there was a worship paid to boulders found on the prairies, these being regarded as representatives of the Earth-god. When an Indian met one of them, he addressed it as "Grandfather," the same term that is applied by many tribes to the President of the United States (wrongly translated the "Great Father.") This term, Grandfather, is applied to supernatural beings. On addressing such a boulder, the Indian laid on it a small quantity of tobacco wrapped in a piece of cloth or skin, and then he smoked his pipe toward it, asking the Grandfather to help him in his journey or undertaking.

Colonel JAMES STEVENSON read a paper on the "MYTHOLOGICAL PAINTING OF THE ZUÑIS."

DISCUSSION.

Col. MALLERY presented the following account of Yuma ceremonies witnessed at Camp Verde, Arizona, as related by Dr. W. H. Corbusier, U. S. A.: "All the medicine-men meet occasionally, and with considerable ceremony make medicine. They went through the performance early in the summer of 1874, on the Reservation, for the purpose of averting the diseases with which the Indians were afflicted the summer previous. In the middle of one of the villages they made a round ramada—or house of boughs—some ten feet in diameter, and under it on the sand, illustrated the spirit-land, in a picture about seven feet across, made in colors by sprinkling powdered leaves and grass, red clay, charcoal, and ashes on the smoothed sand. In the centre was a round spot of red clay about ten inches in diameter, and around it several successive rings

of green and red alternately, each ring being an inch and a half wide; projecting from the outer ring, were four somewhat triangular shaped figures, each one of which corresponded to one of the cardinal points of the compass, giving the whole the appearance of a Maltese cross. Around this cross and between its arms were the figures of men with their feet toward the center—some made of charcoal with ashes for eyes and hair, others of red clay and ashes, etc. These figures were eight or nine inches long, and nearly all of them lacked some part of the body—some an arm, others a leg or the head. The medicine-men seated themselves around the picture, on the ground in a circle, and the Indians from the different bands crowded around them, the old men squatting close by, and the young men standing back of them. After they had invoked the aid of the spirits, in a number of chants, one of their number, apparently the oldest, a toothless, gray-haired man, solemnly arose, and, carefully stepping between the figures of the men, dropped on each one a pinch of the yellow powder, which he took from a small buckskin bag which had been handed to him. He put the powder on the heads of some, on the chests of others, and on other parts of the body, one of the other men sometimes telling him where to put it. After going all around, skipping three figures however, he put up the bag and then went around again, and took from each figure a large pinch of powder, taking up the yellow powder also, and in this way collected a heaping handful. After doing this he stepped back, and another medicine man collected a handful in the same way, others following him. Some of the laymen in their eagerness to get some pressed forward, but were ordered back. But after the medicine men had supplied themselves, the ramada was torn down, and a rush was made by men and boys, handfuls of the dirt were grabbed and rubbed on their bodies, or carried away. The women and children, who were waiting for an invitation, were then called. They rushed to the spot in a crowd, and grabbing handfuls of dirt tossed it up in the air so that it would fall on them, or they rubbed their bodies with it. Mothers throwing it over their children and rubbing it on their heads. This ended the performance.

Mr. GATSCHET said: The Chiricahua Apache "sun circle," or "magic circle," is constructed for the purpose of curing those who have been "sun-struck," or as they express it, those who have become sick from the sun.

Conjurors will consent to construct a circle only when they are called upon by the sick person. The patient must indemnify the conjurors for the arrangements, and provide food for the Indians who congregate to witness the ceremony and participate in the dances. Frequently the sick person is compelled to borrow money to defray the expenses, and then he will kill his cattle to satisfy the appetite of the hungry crowd assisting in the great ceremony.

The conjurors do not always make the magic circles with their own hands. When they have it drawn by others they walk around superintending the work.

A few days before the time appointed for the ceremony the conjurors in charge send out heralds, each provided with several symbols called "nadu 'hkädä," or "God's messengers." One of these symbols is left with every head man or chief of an Apache tribe. Its purpose is to direct them to summon their men, women, and girls to appear and take part in the dances of the ceremony.

When the invited arrive, the nadu 'hkädä are brought back by them and set up in or near the center of the circle during the performances. The symbol is in the shape of a cross. The four arms thus point to the four cardinal points, and the feathers at the ends of each arm represent the birds which convey to the conjurors the dreams of the human figures set up within the circle.

The magic ring is made on the ground in a place carefully screened from mortal eye, and sometimes covered by a shed made of bent willow rods (called in Spanish "ramada".) The circle is properly speaking two concentric rings, and is composed of colored substances of various shades. The diameter of the ring is ten or more feet. Dry leaves of various trees are mostly used in effecting the different shades of color, and, if the weather permits, the conjurors go into the mountains to collect earth, clay, and colored sand for the same purpose. The clay being the same as that used for body paint.

The inner ring of the circle is called bās or nibās (round). The rim of the circles does not follow the line of a true circle but shows sallies and angles. The spaces in the angles are frequently colored. These colors when not of mineral substance are made by drying leaves in the fire and grinding them to powder. The angles or corners in the circle represent rays of the sun and the whole circle is an image of the sun. The effigies of four men, each painted with a different clay color are placed on the inside of the circle; they are called "God's people," or "divine people," and repre-

sent genii that can only be seen by the conjurers in their dreams. They stand on one leg only, the other leg being wrapped around the one on which they stand. This helps, it is said, to remain on their legs longer than by standing in any other way, since one leg adds strength to the other. On their heads they carry an ornament resembling two horns, which are in fact, as the name has it, two hats. The men represented by these effigies are supposed to dream and to convey the import of their dreams to the conjurors by means of birds called "God's messengers," each bird having the same colors as the effigies.

The effigy of the black man lies behind some black rays of the circle and is supposed to have charge of the whole ceremony. The effigy of the blue man stands at the end of blue rays. The effigy of the yellow man is at the end of yellow rays; and the white effigy at the end of white rays.

Before each of these effigies a sort of standard (nadá) is stuck up—about six feet high. They are carried about in the dances and their purpose is, as alleged, the same as our lightning-rods. They say the nadnai insure getting good health while dancing. The chief part of Indian religious ceremonies consist in dances which commence at sundown and continue till sunrise, with only three interruptions for meals. The dances take place at some distance from the magic circle and about a central fire. Near this fire may be seen the pile of firewood provided for the occasion, and on another side a group consisting of conjurors and men of the tribe. Close to the fire are the groups of dancers, male and female. In dancing they do not move about but skip up and down—a mode of dancing common to all Indians of North America. Smaller fires are blazing in a circle around and at some distance from the central fire. About these fires are gathered the people, old and young, while back of them are standing the horses that brought them to the ceremony.

Dances begin when the leading conjuror begins a song. At each new song a girl starts from one of the fires and directs her steps toward the males standing in the central group. She gently touches one man's shoulder and then returns to her family at the fire. This pantomime indicates a sentiment of love and is at the same time an invitation to the dance, which is responded to within a short time by the lucky young man, who is careful not to meet the looks of the girl's mother.

The ending of the ceremony is similar to that described in the Yuma ceremonies.

The cardinal points are symbolized among the Apaches thus:

East—Black.
South—White
West—Yellow.
North—Blue.

The sun in the east is called the "black sun." A wind gust or tornado is also called "black."

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NINETY-SIXTH REGULAR MEETING, May 5, 1885.

Vice-President Col. GARRICK MALLERY, U. S. A., in the Chair.

The Secretary of the Council announced the election of Hon. W. B. Snell, Justice of the Police Court, and Mr. L. J. Hatch, of the Bureau of Engraving and Printing, as active members of the Society, and informed the Society that the Council had determined to print Vol. III of the Transactions of the Society.

Col. F. A. SEELY read a paper entitled "THE GENESIS OF INVENTIONS."

During the past few years unusual attention has been directed to the study of human inventions. The close relations between the amelioration of man's condition and the improvement of his mechanic arts have led to the consideration of the subject as one in which social science is concerned. It has been observed that institutions of every character—languages, laws, customs, philosophies, and beliefs—have been largely, if not wholly, the product of invention of somewhat the same character as that which has produced tools and machines. The term invention has acquired a broader scope, and includes every subject on which human thought and ingenuity and fancy may exercise themselves. Its study is therefore of no little consequence. It is no longer limited to the field of mere mechanics and physics, but embraces all that concerns whatever has been devised by men to satisfy the material and moral needs, either of the individual or of the mass in their various social relations. I propose to inquire what are the processes by which inventions are produced; what influences lead to them; what laws,

if any, they follow; and what results, immediate and ultimate, flow from them. I conceive that these inquiries are best pursued in connection with mechanical inventions. A parallel inquiry might be pursued in respect to inventions in the broader sense. In fact the study of savage society is, to a certain extent, such an inquiry.

Before proceeding to the consideration of the subject, it is important to call attention to the various meanings and shades of meaning of the word *invention*, which we have such constant occasion to employ. A late writer on Patent Law* refers to this in his opening chapter as a source of much confusion, since, as he remarks, it is not uncommon to find the word used in different senses in the same paragraph, even in the same sentence. He distinguishes four meanings of the word:

(1) The mental act of inventing.
(2) The thing invented.
(3) The fact that an invention has been made.
(4) The faculty or quality of invention.

It is scarcely necessary to illustrate these significations, since on a little reflection they become apparent. We may say of the sewing machine, *it was the invention of Howe*, referring to the mental process which produced it; we may say it *is a great or useful invention*, meaning the machine itself; we may say *the invention of it revolutionized the manufacture of clothing*, in which we mean the fact that it was made; and we may say of any particular form presented to us, *there is no invention in it over some earlier form*, in which we refer to the quality of invention as distinguished alike from the mental act, the concrete product, and the historical fact. In view of all these uses of the word and not to overload it further, I shall venture to suggest a new one to designate the study of invention. This study has not yet perhaps developed itself as a true science, though it appears to possess all the elements of a science. As a study of growing interest it is worthy of a name of its own, and, with all deference, I submit to the Society, as an appropriate name worthy of adoption the word *Eurematics*.† This should include the study not of arts, machines, laws or insti-

* Merwin. Patentability of Inventions. Boston. 1883.

† *Εὕρημα*, An invention. If the Greeks had been in the habit of philosophizing about inventions, they would have had an adjective, *εὑρηματίτικος*, and the word would have found its place in English long ago, as has *eureka*.

tutions in themselves, but of them all in respect to their methods of growth and the means by which they have been developed and are still developing. This is a study which many are pursuing with eagerness and delight; and the need of a name for it clearly separating it from other kindred studies is every day more apparent.

It is my purpose to present in this paper a brief chapter in this science, following out and perhaps to some extent repeating some of the thoughts expressed in a paper presented to the Society two years ago,* in which I discussed the nature of the earliest human inventions, the original germs out of which they grew, and the steps and processes by which they were evolved or elaborated. Speculative as some of my suggestions may have been as to the nature of these primitive inventions, nevertheless the nature of the processes by which they were made is so inherent in all arts that it cannot be regarded as in any degree speculative. Possibly the inventions pointed out were not actually the first contrived by man, but whatever were the first, the way described is beyond doubt the way in which they were arrived at.

I propose in the course of this paper to discuss the development of the stone hatchet in its most finished form; but before doing so it is necessary to inquire into the nature of invention and some of the general principles it follows. Lying absolutely at the bottom of such principles are the following postulates, the A B C of Eurematics: Given any artificial implement or product, we must assume—1st, *that there was a time when it did not exist;* 2d, *that before it existed there must have been a creature capable of producing it;* and 3d, *that such creature before producing it must have been conscious of needing it, or must have had use for it.*

There can be no orderly discussion of the genesis of any art without recognizing the truth of these postulates at every step. Questions may arise upon resultant or collateral propositions, but, admitting all that can possibly be claimed for accident as an element in invention, these propositions are not to be questioned. They are fundamental, and no logical consequences that flow from them can be evaded.

The first proposition, that before any artificial product existed

* An Inquiry into the Origin of Invention. Vol. II, Trans. Anthrop. Soc., Washington. 1883.

there was a time when it did not exist, is not startling, and may be passed over for the second: before it existed there was a creature capable of producing it. This is as much as saying that no product of art came into existence simultaneously with its producer, and seems to be no more startling a proposition than the first; and yet, if I rightly interpret the ideas of most writers, they have failed to grasp even so common-place a truth.

The third proposition, that the producer must have been conscious of needing the product, or must have had use for it before producing it, is not at first sight so obvious. In fact I believe the failure to grasp this truth is a great source of error and misconception among many writers. No one, however, who has given any thought to the nature of invention, has failed to observe that every step in the mechanic arts has grown out of a pre-existing want. Not necessarily out of a pressing need. Invention now-a-days does not wait for the call to be so urgent that waiting can be no longer. Long before this stage necessities are anticipated, and the means by which they are overcome often do not become indispensable till the very habits they engender make them so. Illustrations of this are all around us. The sewing machine, the reaper, the telephone—what could we do without them? And yet in our own generation we have done without them all. They have themselves created the conditions which have made them indispensable. But none of them came by accident. They have been, every one, the fruit of years of toil and thought and anxiety on the part of those who saw, what few clearly comprehended, the imperfection of the means employed to do the daily work of mankind, and studied to produce better means. This is the history of steam, of electricity, of railroads, of metal working, of pottery, of every art that has a recorded history. Prevision and calculation are so truly elements in the growth of all known arts that in asserting their universality we incur no more risk than did Newton in asserting the law of gravitation.

What then, it may be asked, is the place due to accident in invention? Notwithstanding a popular belief that many if not most of the great inventions have been the fruit of accident, it may be asserted that the contrary is true. Fortuitous circumstances, trifling unforeseen incidents, have in many cases doubtless suggested expedients which have led to the consummation of great inventions. It was an accident—the result of his poverty—which led Senefelder to write on a stone slab his family wash-bill, and so led to the inven-

tion of the lithographic process; but the accident did not occur, and could not, till long and persevering pursuit of a method of printing cheap music had brought together the polished stone, the ink, the acid,—all the materials necessary to accomplish the result. Possibly it was an accident which led Goodyear to the use of sulphur for the vulcanization of India rubber; but the accident, if such it were, did not occur till years of expense and toil and experiment with a great variety of materials had led the way to it. And the rubber and the sulphur and all the appliances necessary for the experiment were ready to his hand, all accumulated in the pursuit of his lifelong purpose. Such experiences are common, and familiar illustrations of them are found, as for instance, in the lives of Palissy, the Huguenot potter, and William Lee, the inventor of the stocking loom. In these the element of accident enters in some degree into the consummation of the invention; but in every case it is such accident as might have occurred a thousand times over without result to other men whose minds were not intent upon the invention. Lamps had swung for centuries in the Italian cathedrals, and men had idly counted their oscillations as they kept time to the tedious delivery of generations of dull sermons; but the isochronism of their swing, if observed at all, was not regarded till Galileo came.

The true and only field that philosophy can concede to accident in invention is that it supplements and sometimes abridges the labor, calculation, and time of the inventor. To a man filled with a steadfast purpose, all his senses alert to every means chance or calculation may present to accomplish it, the most trifling incident may furnish the clue, which has fled from him like an *ignis fatuus*. To another the same chances may come and go continually without result. And while it cannot be said that accident has no place in invention, it must be conceded that its place is completely subordinate to other elements. Great inventions have been the fruit of accident in the same sense and to the same degree that a ripened peach is the fruit of the rude blast that shakes it from the bough.

It is important in a discussion like this to keep clearly in mind the difference between invention proper and discovery. The function of the latter is to bring to light the material facts, and the natural laws, which the former applies to useful purposes; and in respect to discovery, the element of chance, of accident, is im-

portant. The progress of scientific discovery is marked at every milestone by the revelations of accidents, which the thoughtful mind of the inventor did not apply to practical ends till long afterwards, when the need had arisen. If it was an accident that led Galileo to the discovery of the isochronous oscillation of the pendulum, it was not till fifty years afterwards that this discovery was applied to regulate the movement of a clock. The phenomena of electricity that accident may have revealed to Galvani and Volta, are the basis of inventions that the most active minds of this decade are expending their best energies upon. It cannot be denied that in discovery accident has played an important part; but the more this fact is considered, and the more we consider the true function of discovery, the more strongly do we find the proposition confirmed that improvements in the arts are not the result of chance but of intelligent efforts to supply conscious needs. Hence I shall regard this proposition as conceded, and I pass to another.

(4) *Every human invention has sprung from some prior invention or from some prior known expedient.* Inventions do not, like their protectress, Pallas Athéne, spring forth full grown from the heads of their authors. This suggestion needs no argument when made regarding any of the modern inventions. Every one of them is seen by the most superficial observer to be built upon or elaborated out of inventions and expedients previously in use. It is only when we go back of these and study the expedients and appliances out of which they have grown, and whose history is unrecorded, that the proposition I contend for is not obvious. And yet there is not a single one of them which does not when studied exhibit in itself the evidences of a similar substructure. In the process of elimination we go back and back, and find no resting place till we reach the rude set of expedients, the original endowment of men and brutes alike. This is a truth which study more and more confirms, and from it the proposition stated may be deduced as one of the laws of invention.

It may be deduced as a corollary to this proposition, but at the same time a fact determinable by independent observation, that the generation of one invention from another is not immediate but always through one or more intermediate steps. The effect of every invention fundamental in its character is first to generate wants before unknown or unfelt. The effort to supply these wants leads to

new inventions.* These may be quite distinct in their character from the original invention to which they indirectly owe their origin. They are related to it only as means to supply some want to which it has given birth. I shall not pursue this branch of the subject. Illustrations will occur to all. There is hardly a branch of industry that has not felt the effect of inventions based upon wants created by the introduction of petroleum, or the general use of the telephone. Wood-working, mining, transportation by land and sea—all the avocations of men—have felt their influence, have found wants engendered by their use, and improvements have been made to meet these wants. The wants of primitive man were limited, and his inventions were accordingly few. As wants increased in number and intensity, inventions multiplied, and the numberless wants of modern civilized life are only paralleled by its numberless arts and expedients.

I set it down as a fifth proposition: *Inventions always generate wants, and these wants generate other inventions.*

A sixth proposition is that the *invention of tools and implements proceeds by specialization.* This is true to a certain extent of all arts, though perhaps not a universal truth regarding all invention. It results, as will be apparent on reflection, from the last proposition. A single tool may have a great variety of uses, but, if there is a sufficient requirement, men will not long be contented with one tool for those uses for which it is least convenient. It will be reserved for that to which it is best adapted, and other forms will be devised better suited for special uses; possibly the parent type may be found inferior for all uses to some of its modified forms, and it may, on the principle of the survival of the fittest, become obsolete. Look at the variety of tools on a joiner's bench, chisels, planes, saws, each especially adapted for its particular work, but all pointing back to a time when there was but one form of chisel, or plane, or saw. The "jack-plane" and "long-jointer" may each be made to perform the work of the other, but they do it very imperfectly. The primitive bench plane was like neither, but was the type of

* A curious instance of this is brought to my attention while writing this paper. In consequence of the expiration of the earlier patents on roller-skates, a great impetus has been given to their manufacture, the result being the exhaustion of the world's stock of boxwood of certain sizes used for rollers. And to supply the want so created hundreds of people are trying to invent a suitable and cheap substitute for boxwood for this purpose.

both. There is nothing more striking than the variety of cutlery on a well-furnished table. The time is not remote when one knife worn at the belt served the purpose of all these, so far as these purposes existed, and of many others; when the table knife was not differentiated from the dagger of the soldier or the tool of the artisan. A man then used one knife to cut out a leather sole, to shape his arrow, to carve his food, and to stab his enemy. Changes in modes of living have led first to the broader specializations; fashion, caprice, and increasing refinement to others; till one scarcely dares attempt to enumerate the various forms of carvers and table knives of various sorts differing in form and material, each adapted by some feature for its particular use, and each the result of some degree of invention, with which the tables of Europe and America are furnished. Undoubtedly this process has gone on ever since man became an inventor, and might be illustrated as perfectly, though not so profusely, in the implements and weapons of the savage as in those of civilized men. All study of invention must take account of it. As soon as men began to adapt sticks to their use by artificially pointing them they began to find in them various degrees of hardness, weight, length, and rigidity, qualities fitting them for diverse uses, and as skill and experience were acquired they fashioned them accordingly. Likewise when man had begun to employ flint flakes, and before he had learned to fashion them to his will, he selected from the splinters made by accident or by his own unskilled blows those which served best such diversified uses as he had found out.

My seventh proposition, and final one so far as this paper is concerned, is that *no art makes progress alone*. I venture to assert the universality of this truth from what is seen in the recorded history of all inventions. In the development of the mechanic arts, two or more arts distinct in their nature but having close interdependence make advance *pari passu*. If one lags the other is necessarily retarded. If one makes rapid progress the other springs forward with quickened impulses. An improved utensil or article of manufacture may be the result of or may lead to improved processes and tools and machines for producing it, or to improved means for its employment. The progress of the steam-engine was long retarded by the imperfection of iron-working machines, since perfect cylinders could not be produced. The progress of electrical invention has necessitated the invention of new machines and processes for insulating

wire. The introduction of illuminating gas has created a demand for metal tubing, and machines for its rapid and perfect manufacture. And so every step in every art is marked by one or more corresponding steps in other arts.

These general principles, imperfectly stated as they are, by no means exhaust the study of invention. They only lie at its threshhold. They are among the more obvious laws which inventions follow as they are every day presented to the mind of those who deal with them: so obvious, that I have found myself hesitating as to the value of their presentation in this form; a hesitation which is removed by observing that, so far as writers upon early inventions are concerned, they are unnoticed and apparently unknown. Further chapters in Euematics might be devoted to the elucidation of other truths equally generic and universal, but more intricate and therefore less obvious. I might cite for instance the tendency of civilization to convert luxuries into necessaries, true not only of absolute civilization but of every stage of it or every step towards it. The effect of this tendency upon inventions is marked and positive. I might cite the fact that invention is stimulated by rewards and retarded by opposition, which history abundantly illustrates,—eminently the histories of France in the middle ages, of The Netherlands, of Great Britain, and of our own country. Another proposition might be that the truth regarding biologic evolution—that the type of any species which is to predominate is at its first appearance unconspicuous—applies equally to the evolution of arts. Many such propositions more or less recondite might be stated, the adequate discussion of which would require a volume; but I can afford to pass them by, as I have not set out upon an exhaustive study. The few propositions considered are enough for the present purpose.

I shall now discuss the progress of invention in a single direction, partly as a study in itself, partly by way of illustration of the doctrines I have enunciated. I have selected the stone hatchet for this purpose because in some of its ruder forms it represents the earliest human workmanship of which any knowledge has come to us, and also because in its rudest form it presents the evidences of being the fruit of long antecedent growth. Further than this I observe that primitive as it indeed is, and in its highest development rude and ineffective in comparison with the finished implement of this age of steel, the thoughtful student of invention sees in it the culmination for the time being of human art rather than

the beginning. For the purposes of this paper I regard nothing less than the hafted celt as the finished implement whose genesis I shall attempt to indicate.

I assume as the starting point the conclusion reached in my paper before referred to,* that the earliest mechanical process employed by man was the art of working wood by abrasion. This cannot be regarded as proven; absolutely proven it can never be; but it comes in as a link connecting what must have been in the history of primitive man with what is revealed to us regarding the man of the earliest stone age. This art, or something closely similar to it, appears as the immediate derivative of the original mechanical expedients of man in a state of nature, and of the wants engendered by his human characteristics. Tracing back the art of wood working we find no resting place till we come to the art in this condition. In short the more the subject is contemplated, and from whatever point of view, the stronger appear the probabilities, so strong that to my own mind they are convincing. Starting from this basis, what was the process, what the result sought, what the methods employed to produce it?

The object sought for was a pike, a strong, rigid, sharp-pointed stick or shaft adapted for use as an offensive and defensive weapon, a want early felt and hitherto imperfectly supplied by chance and nature. The means employed was a rough rock, a coarse sandstone or mill-stone-grit upon whose exposed surface the wood was rubbed or drawn back and forth until reduced as desired. A tedious process, but not more so than many of those employed to this day in the arts of savage life. We can imagine men coming from great distances to the inventor of this art with poles on their shoulders to be prepared in the new style. It would not at once be perceived that no special properties attached to this particular rock, that rocks having similar properties and perhaps better suited to the purpose were every where. The mind was dull in grasping the essential fact of the art, and perhaps for ages superstition and fetichism may have been engendered by this very improvement. It is easy to see, however, that it had created a new want, or perhaps intensified the old one. Pikes were liable to be broken, were subject to natural decay. They must be replaced, and new ones were always in demand. Their artificial production had increased the number of their

* An Inquiry into the Origin of Invention. Vol. II. Trans. Anthrop. Soc. Washington. 1883.

possessors, and the want of a ready means for the replacement was more widely felt. To the majority it was a new want. Hence among people widely scattered, more convenient and accessible means were sought for supplying the demand; and in answer to this want came the discovery, perhaps the result of similar experiences and observations, that gritty rocks every where would yield the same results to similar manipulation by the hands of any one. And a further discovery followed close on the heels of this, that the jagged edges of flints and other hard rocks would by a manipulation but little varied perform the work better and faster than the gritty surface of the sand stones. A stick drawn forcibly over such a sharp edge has its surface scraped from it in thin shavings instead of being merely abraded as heretofore. This important step from abrasion to scraping, which is in fact cutting, was therefore reached before any cutting or abrading tool had been devised. Reached by slow steps, in answer to a felt want, but a want in no way pointing to it, it was actually the invention of another and quite distinct mechanical process. It was a better process, gave better results, and the weapon and the art of wood working made progress together.

We have advanced one step, man now has the notion of the cutting edge and its use. But it is part of an immovable bowlder or ledge, not always accessible, and the want of a convenient means always at hand is but partially supplied. The long pilgrimages which had to be taken to the primitive pointer of pikes were at an end, but the journeys though shorter still have to be made. How was the next step, resulting in the production of a portable cutting implement, to be accomplished?

It will be seen at once that in the use for a considerable period of the edge of a rock for cutting purposes it will become dulled. Other parts of the rock having exposed edges will be sought, and these will become dull in turn. This dulling process proceeds more or less rapidly according to the material applied to it; and as the harder woods were found to be in all respects more serviceable they were more generally used. We may conceive that at some time by the violent application of a hard piece of timber to an edge somewhat thinner than ordinary, the edge itself instead of being merely dulled is broken off, and to the pleasant surprise of the operator a new edge, sharp and clear, and better than the half-dulled one he had been using, makes its appearance. And he eventually learns that he can at any time produce a new edge by shivering off a piece

of the rock with blows. He is not long in learning that the part broken off has similar edges. If it be large enough to lie firmly he can employ it as he does the parent rock. If smaller, he may hold it firmly with his feet while he manipulates the wood upon it with his hands. Perhaps he can carry it away and use it at the place most convenient to him; when dulled he can shiver it by a blow or two and it is sharp again. And then at last by slow degrees, requiring ages perhaps, one can hardly tell how, but by the continuance of this process, he observes that these splinters struck from the fragment, these fragments of fragments, possess the same cutting edges as the original rock, and in a bit of stone not larger than his hand or his finger he possesses an instrumentality capable of doing all that he and his ancestors have been laboriously doing on the parent rock or clumsy fragment. He learns also that instead of dragging the wood over the edge, he can, with a totally different manipulation, hold the wood firmly and operate on it with the stone splinter, and the tool is invented.*

When I think of man in his primitive condition, as the logical necessities of this subject have compelled me to think of him, helpless, miserable, the prey of beasts, without tools, without means of defense except such as he shared with the beasts, and then think of him in the condition to which he is brought in this outline of his inventions, I find it impossible to adequately express my sense of the progress he has made. One effective weapon, its structure improved, and skill in its use acquired by generations of experience, and one cutting tool, even in the rudimentary form of an unfashioned flake, have separated him incalculably from the condition of his ancestors. His knife or hatchet, as we may henceforth call it, contained within it all the possibilities of the future, but for the present—his present—its capabilities were learned by constant lessons and with every new occasion. He had no want to which it did not minister. It not only served its first purpose to prepare his weapon, but it became itself a weapon. It served him to procure and prepare his food, both animal and vegetable, his shelter, his raiment, if he had reached the stage of wanting raiment. Its

* It is only by a loose construction of language that this can be called the invention of a tool. The tool, a mere flake of stone, had already long existed. The actual invention was an art or process quite distinct from any heretofore employed. The brief and more popular form of expression may be employed with this explanation.

acquisition was the greatest step he had taken in invention; and when we regard what has grown out of it, the infinite variety of cutting tools, implements, and machines, whose origin we remotely trace to it, and the unnumbered needs they supply, we cannot hesitate to ascribe to it the highest place among all the inventions of all time.

If the hafted celt was for the time the culmination of art, this is not less true, of its time, of the flint knife. As in man's rudest estate he used the expedients with which nature endowed him, selecting those best adapted to his immediate purpose, so now out of the diverse forms assumed by flakes and chips, he selects those best adapted for particular purposes. He is repeating what occurred in his earliest period, but with new and diversified wants, wider intelligence, and a greater range of material out of which to select. He finds blunt edges give satisfactory results in the old process of scraping wood, but he finds that thinner and sharper edges penetrate the wood deeper, and remove the superfluous material faster. He finds he can work more deftly, more conveniently, can put a finer point on his weapon, can apply the new tool to all parts of it, can reduce and trim the shaft as well as the point, can even sever the growing saplings to obtain his material. He finds that some forms can be made to penetrate and divide the tough skins of beasts, and carve their flesh. In fact, in whatever direction his necessities or inclinations lead him, he finds his knife in some form contributing to his comfort, his protection, and the supply of his wants. The possession of the tool has wrought out his mastery over nature.

This culmination in invention is but momentary. It is a milestone, a breathing place in the history of arts. But the march still goes on, and we find man still searching among fragments for forms adapted to his particular uses, but gradually learning by experience that by well-directed blows he can sometimes produce chips having special forms, and so fitted for special uses. But these are chips and flakes only. There is no attempt as yet at dressing or shaping stone. The rude forms they bear when shivered from the rock, are all that man has yet conceived in the structure of a stone implement. These rude forms seldom appear in our museums. They are the scoff of archæologists. They are not distinguishable from the work of the elements. In fact, the splinters thrown off by frost or fire may have been as readily selected for use as those formed by human agency. And as writers have agreed upon

the name *palæolithic* to indicate the age marked by the first traces of human workmanship in stone implements, we must recognize the *protolithic* age, in which stone fragments showing no trace of such workmanship were the common implements of mankind. The earliest age of wrought implements could never have come but for such a precursor. The rudest wrought forms did not appear till something of the same nature and used for the same purposes, but imperfectly adapted for their performance, had created the need of them and led up to the means for its supply, and the one thing which bore these relations to the earliest recognizable forms of dressed-stone implements was the unformed flake.

What were the steps from this form of flint knife, or scraper, or hatchet, to the hafted celt?

I formerly reached the conclusion that the original endowment of man could include no less than the stick and stone for striking and hurling, and the string or withe for tying or binding. In the course of this paper I have traced the synchronous development of the art of dressing wood, and of stone appliances for the purpose. With the advancement of these it is not to be supposed any former art or expedient was lost. On the contrary it is to be presumed that progress in them had been made corresponding to that we have been following. The club was better fashioned; approved forms of hurling-sticks may have been discovered and come into use. Greater skill may have been acquired in the use of the hammer-stone, and judgment in the selection of suitable forms either for crushing, or for splitting, and with more convenient hand-grasp. The flexible vines and strips of bark, with which primitive man lashed his frail shelter, his successor may have improved by rudely twisting the fibres or strands, or have supplemented by other materials, notably, after he had acquired the use of the flint knife, by strips of skin and animal tendons. The inventory of his possessions then would embrace the club and pike, each clearly specialized, the hammer-stone, not formed by art but selected, the stone knife, and strings of various materials. The pike, the hammer stone and knife may have been of many forms. Now it will be seen that these elements may be brought together in various ways so as to accomplish a variety of results, the elements in every case being a stick, a stone, and a string to bind them together, and the difference in result depending on the particular form of stick and stone. For instance the heavy end of a club is made heavier by lashing to it a hammer stone—result the mace. The pike is improved by securing to it a

pointed flake of flint. A flint flake too small for the hand is made effective by fixing it to a piece of wood, making a knife or dagger. A heavier sharp-edged fragment secured to a handle adapting it for striking, becomes the axe or hatchet. What immediate incidents or needs led to any of these combinations, I do not propose to guess. It is enough to have shown that at a period when man was as yet unlearned in respect to any dressing of stone beyond knocking off rude splinters from a rock, he may have had in his possession the means to produce, and was fully capable of producing, such implements and weapons as I have named. This being true, the same wants which might at any period of his history have led to their production may without violence be presumed to have done so then. They are in the line of his acquired arts, and the necessary links between these and the arts he is yet to acquire.

Whether these various combinations were made prior to actual working of flint it would be idle to speculate. It is more likely that neither preceded the other. While man was finding out how to use his possessions by bringing them together in new combinations, he was naturally improving them all. Having found the flint and other rocks of similar texture so far obedient to his power that they could be shattered, and new and useful forms produced, having acquired uses for these forms, having learned the purposes to which a sharp edge could be applied, and that a fresh one could be produced by knocking off the dulled one—it followed in due course, from experience, to form the new edge with less violent blows, with more judgment and dexterity, and, as the advantage of special forms became apparent, with a view to bringing it as close as possible to such forms. And all this time the old art of reducing by abrasion had not been lost; applying it now to the stone as finer and finer chipping suggested and provoked the desire for a smoother edge, the celt appeared, polished at first on its edge only, afterwards on its entire surface. There was no dividing line between the palæolithic and neolithic ages. If separated at all, it is by a broad zone through which the implements of both are found side by side. Neither was there any step from the finished celt to the hafted implement. The essential step, that of securing a stone in some form to a handle, had been taken long ago.

Lest it might be suggested that in order to sustain a theory regarding the developement of the arts, I have myself been led to invent steps in art that were never known to man, it is worth while to remark

that none of the steps I have set forth are imaginary. All of them are in existence and in use yet, in their appropriate places, often amidst the completest appliances of modern mechanic arts. If the primitive man sharpened a stick by rubbing it over a rough grit, he used the same means an artist employs to-day to produce a fine point on his pencil, and the same by which we sharpen all cutting tools. The scraping tool is one of the ordinary provisions of a joiner's outfit; but the use of a bit of broken glass is more common still. As the edge becomes dulled by use, the glass is simply broken and two fresh edges are formed. This is universal in civilized life, and a curious instance of it in savage life has just been brought to light by the Rev. Lorimer Fison, in his pamphlet on the Nanga or Sacred Stone Inclosure of Fiji, in which he relates often having seen "a mother shaving her child's head with a bit of glass, and biting a new edge on the instrument when it became dull." These original arts have never been lost. Probably it is a general truth regarding mechanic arts that no one of them once commonly acquired is ever again lost. It may be laid aside for a time or suspended, but it revives in some form; and I venture to think that much of the eloquence that has been expended upon the "The Lost Arts" has resulted from a very imperfect acquaintance with those that exist.

It is apparent that every step in the progress that has been recited resulted in an improvement in man's condition. The first improved weapon, club or pike or missile, was equivalent to so much greater strength of arm or length of reach. It augmented man's superiority over the brutes; it made his life less precarious; it put the means of securing food, shelter, and covering more fully within his power. His environment, to which he had in his primitive condition been completely subject, he now could to a certain extent control, could subject to himself. The first improved means of fabricating a weapon, the first tool or mechanical process, accomplished these results in an increased ratio. The step that made the cutting tool the possible possession of every man, which made the knife even in its clumsiest form a common tool, did for the whole race what the earliest steps did for a limited number, and made this amelioration general. The increased number of forms and varieties of tools and weapons, growing out of the diverse and manifold wants they were adapted to supply, were each steps in the betterment of his material condition, each an indication of progress; man's advance towards civilization, slow as it must have been, was

marked off step by step by the advances he made in his mechanic arts. The more he became independent of nature and capable of forcing her into his service the more time and inclination he found for the perfecting of his implements; and the more he perfected his implements the more capable he became of subduing nature. And this interaction has never ceased, it goes on to-day. But the achievements of to-day are not the conquest of savage beasts, nor the solution of the problems of food and shelter and warmth. We are overcoming time and distance; we are conquering the barriers of sea and mountain; we are finding out the more hidden forces of nature, and subjecting them. The fruit of our inventions is not seen in rough flakes of stone lashed by sinew to rude hafts, but in the mighty movement of the railway train thundering across the continent, or the click of the telegraph as London talks with Calcutta. And every step in progress has been a step in the improvement of man's condition from the first to the last. And so it shall be in the future.

Artists depict the genius of invention as a voluptuous female figure, in various stages of imperfect attire, attended by innocent boys in their primitive nudity, and with gear wheels and anvils and other rough equipments of the artisan in ill-assorted proximity. This is a feeble conception. The genius of invention is not a creature of delicate mould, but one of brawn and sinew. His voice is no gentle song of lullaby, but comes to us in the deafening clatter of Lowell looms and the roar of Pittsburgh forges. Mighty and beneficent and responsive to human wants—this is the kind of song he sings in his rugged rhythm:

"I am monarch of all the forges:
I have solved the riddle of fire;
The amen of Nature to cry of man
Answers at my desire.
I grasp with the subtle soul of flame
The heart of the rocky earth;
And hot from my anvils the prophecies
Of the miracle years leap forth.

I am swart with the soot of my furnace,
I drip with the sweat of toil;
My fingers throttle the savage waste,
I tear the curse from the soil;
I fling the bridges across the gulfs
That hold us from the To-Be;
And build the roads for the bannered march
Of crowned humanity."

DISCUSSION.

Mr. P. B. PIERCE, discussing the paper, referred to some of the curiosities or phenomena of invention; for this science of *eurematics*, like every science, has its attendant phenomena. Indeed, that invention is a science is demonstrated by its attendant phenomena.

Invention is not creation; the first deals with matter direct; the latter supplies that with which invention deals. The student of eurematics, giving heed to what the history of his science has to teach, soon discovers the principles of the great law of evolution. Let him inspect the almost humanized giant that bears its load of living freight daily from Washington to New York in less than six hours, and what does he find, except that since the days of Watt the process of selection or differentiation has been intelligently going on! The clumsy, the crude, the ruder elements have been rejected; the harmonious, the simple, the efficient, and stronger have been utilized. Increment by increment complexity has given way to simplicity, until the perfected machine stands forth as we know it; that is to say, the machine we are pleased to call *perfect*, the selected excellence, the *summum bonum*, of all that experience and long use have taught to be best of those that have preceded it. Each inventor has contributed his mite, and lo! the grand result! And its maker, man, is he not perfecting himself along with that dull matter upon which he works and in which he achieves! Is he not, as described by the poet,

> The heir of all the ages in the foremost files of time?

Is not matter reflex? Is Frankenstein in reality the monster his author protrayed him to be? Will not the science of eurematics, when once fairly beset by the persistent inquisition of scientific study and investigation, open wide the door of the temple that is even now ajar, and permit its disciples to enter and make intelligent conquest, under a full knowledge of its laws, where until now they have only been permitted to make occasional, random captures from the *vestibulum*, as it were?

The thousand forces of nature lie hidden within grasping distance; but for lack of systematic study they elude our clutch, escaping from our wiliest approaches as the thistle down upon a puff of air. This may not always remain so. The Lilliputians bound Gulliver with straws; let us ply Nature with pitiless interrogation till she yields

us the fullest knowledge of all her laws. For this is eurematics in its broadest significance; it is encompassing the laws of nature with material form and compelling matter to do the bidding of psychical energy.

But evolution does not account for all. There is in invention a synchromism that is almost mysterious. The present is the grand harvest time of all the seed that has been planted by the generations that have preceded us; but why the thoughts of inventive minds appear to move in batallions, all aiming at some common objective, seems at first view almost inexplicable. A given function is demonstrably demanded; a hundred minds set themselves at once, in all parts of the world, to produce the means for its satisfaction. With the almost universal diffusion of information that has come about with the art of printing, even in all languages and tongues, aided by the telegraph and the telephone, who fails to know in all the broad earth to-morrow morning what the chiefest want of to-day has been? Within one month's time from the great flour-dust explosion in the mills of Minneapolis, in May, 1878, there were over thirty inventions made for preventing the recurrence of such an accident, and all practically effective. Many of them were almost if not quite identical, although made by men having no knowledge even of each others' existence, and in all parts of the world! So quickly, when a pressing want is known, is the means supplied for staying the same. When the science of invention has been perfected, and every want has been given a means for its satisfaction, will not the highest type of invention then be the discovery of a new want, latent in the human soul, but never before developed?

Another feature of invention noticeable to an attentive observer is the isolation in which an important discovery is often times set. The evolution of the automatic grain binder of this day, from the sickle of Egypt and the Orient, is plain and familiar. To one who has witnessed the devouring knives of this latest type of human genius, hungrily levelling the yellow harvests of the great northwest and tossing the bundled sheaves backward in serried rows upon the stubble, and contrasts its action with that of the reaper in the time of Boaz, how far apart they seem separated! And so they are, wide centuries apart. But the quick mind of invention anticipated the want almost in the earliest day of the reaper. In the year 1854 two men invented, perfected, reduced to practice, and patented the

completed machine whose opportunity for use did not come until twenty-five years later. Like lonely islands arising out of the receding waters of an ocean, such inventions, though they may afterwards be the highest lands of great and fundamental enterprise, are lost for want of use. Although pioneers their inventors are without remuneration because they are too far in front of the needs of the world. The world itself is ever unready; the lines of necessity are conservative and strenuously refuse to make room for the new applicant for favor, even though full of promise.

Mr. Wm. H. Babcock said no one, on glancing over our patents, can fail to observe how many of the inventions covered by them are obviously outgrowths of those already in existence rather than contrivances adapted to meet any real want. A man sees a particular machine, or a description of one, and forthwith proceeds to devise a similar but slightly different construction. Thus there are, for example, more than three thousand patents on car couplers, most of them varying from others in a trivial degree, very few of them being actually in use. A large class of our inventions are of this incidental kind.

But another large class of inventions have grown mainly out of a distinct conception of a public demand, real, foreseen, or fancied, or of the practical needs of manufacture. Exclusive of certain sporadic and eccentric instances, inventors are either manufacturers, the men employed by them, or who expect to sell to them. All these are on the alert to note the drift of public taste and practical requirements. A manufacturer sees, or thinks he sees, that a new article, or a change in an old one, would meet with or lead to a considerable sale; or that a simplification of his machinery would enable him to reduce his force or his fuel; a factory hand finds that the machine with which he works has some persistent, annoying defect which a slight alteration would avoid; an outsider in a factory village forms his own theory as to what would give one competing manufacturer an advantage over another and knows that it would be well paid for; in all these influences the exertion of ingenuity is easily accounted for.

The effect of the public demand is curiously illustrated in the synchronism of invention. It frequently happens that men widely separated territorially and having no discoverable communication with one another make the same invention at the same time, or so nearly at the same time that priority cannot easily be determined.

The progress of a certain art has reached a point where a given step becomes inevitable, and like causes produce like results everywhere.

This shows, further, that the individual man is of less importance as a factor in invention, than his environment. Indeed invention in the wide vague popular sense can hardly be said to exist. Even our greatest inventions have proceeded by a succession of small increments. Each man puts a round in the ladder, and the next climbs on it to put in his higher up. The one who puts in the last round steps from it to receive the crown of success, although his contribution may have been the least of any; and his even more meritorious predecessors who failed, but made that success possible, are generally forgotten.

Invention for the pleasure of inventing is of prime importance in literature and art, and cannot be wholly ignored even in treating of mechanical matters. Many men delight in experimenting with machinery, combining element with element, adapting every part with every other and to the end in view. They find invention "its own exceeding great reward." Every one who deals with inventors can recall such enthusiasts, who are often men of notable if narrow ability, and, on the whole, the most interesting of their tribe.

Mr. A. W. HART said: I am very glad that, among other things he has done, Col. Seely has put his foot down on the theory that accident is the mother of invention. This is a popular error which most of us may have sometime shared—certainly, I must admit it was included once in my catalogue of sins. What are called accidents are in reality normal results of a search or inquiry, or series of experiments, such, for example, in the geographical field, as the discovery of America by Columbus, or in the healing art, the prevention of cholera by inoculation with cholera germs if that is the correct term. In the way of a homely illustration, I will relate a personal incident. A friend proposed a walk to Arlington, and said we would look on the way for Indian arrow-heads. I assented but said that I never found an arrow-head in my life. "That is merely because you never looked for them," replied my friend. We went, and sure enough, found the arrow-head, and I found another the next walk I took in search for one. Now, while in a certain sense I may call that finding an accident, in the true and proper sense, it was none at all. It was the regular legitimate result of the search instituted. But for the preparation or plan and its systematic execution, the "accident" of discovery would never

have occurred. So inventions come when we are ripe for them and look for and strive after them—and then they are not accidents, but logical endings of systematic beginnings—just as the solution of a mathematical problem follows its working.

One may walk—as the savage does—over diamond or coal fields, rich bottom lands, or gold-bearing rocks, seeing nothing of their nature, contents or potentialities because intent on other things—of the hunt or war—and because not developed to any possible comprehension of anything more. But the civilized and mentally and scientifically developed man, going over the same ground might make valuable discoveries, for good to himself and his fellows, while losing sight of the beasts or the signs of presence of others that the eye of the savage takes in. The latter is therefore not to be charged with negligence, nor the civilized man with being the victim of an accident. So inventions come when we are ready for and seek them, —as apples fall into the basket we hold to catch them when ripe and ready to drop.

Mr. MURDOCH read a paper on the "SINEW-BACKED BOW OF THE ESKIMO."

All the branches of the widely-distributed Eskimo race now live in regions which are either treeless or else deprived of the ash and other elastic woods fit for making bows. The fact that the bow was in general use among the Eskimo previous to the introduction of firearms is one of the arguments that they have not always lived in the regions which they now inhabit, but have moved on from places where wood suitable for the purpose was to be obtained. As they gradually became settled in their new homes, probably before the different branches were so widely separated from the original stock as they are now, and as the simple bows which they had brought with them from their old country became worn out and had to be replaced, it was necessary to find some means of giving the needful elasticity to the brittle spruce and fir, frequently rendered still more brittle by a long drift on river and sea, followed by exposure to sun and rain on the sea-beach. In some places even driftwood is so scarce that bows were made of no better material than dry antler. The elastic sinews of several animals, especially of the reindeer, furnished the means desired of making an efficient weapon out of these poor materials. This is not employed in the way used by the Indians of the plains, who glue a broad strip of sinew along the

back of the bow, but is braided or twisted into a cord the size of stout whip-cord, which is laid on in a continuous piece so that there are numerous strands of the elastic cord running along the back of the bow so as to be stretched when the bow is drawn. The simplest or, so to speak, ancestral pattern of sinew-backed bow from which the types now in use are evidently derived is one in which there are a dozen or twenty of such plain strands along the back, running around the "nocks" and held down by knotting the end of the cord round the handle. Bows of this form, slightly modified by having the cords somewhat twisted from the middle, so as to increase their tension, are still to be found in Baffin Land, where many of the arts seem in a lower state of development than among the Greenlanders, on the one hand, or the Western Eskimos, on the other. Let us now consider how in course of time the different branches of the Eskimo race have improved upon this simple invention. Along the well-wooded shores of southern Alaska, from the island of Kadiak nearly to the mouth of the Yukon, where there is plenty of fresh, living spruce, they have chiefly increased the efficiency of the bow by lengthening and broadening it, and have paid but little attention to the sinew backing, contenting themselves with slightly increasing the number of strands, wrapping them round with a spiral seizing, which prevents them from spreading, and occasionally adding a few more strands which only extend part way to the tips, being secured by hitches round the bow. This makes the bow a little stiffer in the middle than at the ends, where less strength is required. On the other hand, the people who live along the treeless shores of the Arctic Ocean, from the Mackenzie river to Bering Strait, can obtain no wood better than the dead and weathered spruce which the sea casts upon the beach. Consequently, all improvements in the weapon were of necessity confined to the sinew backing, which has developed into a marvel of complication and perfection, while the bow itself is rather short and not especially stout. Starting as before with a loop at one end of the cord strands are laid on from nock to nock until there are enough of them to give sufficient stiffness to the ends of the bow. Then the cord goes only to within 6 or 8 inches of the tip and is secured round the bow by hitches, sometimes a very complicated lashing of as many as a dozen half hitches alternately in opposite directions, and returns to a corresponding place at the other end, where it is similarly hitched. In this way strand after strand is laid on, each pair shorter

than the preceding, and the backing constantly thickening towards the middle of the bow. When sufficient strands are laid on they are separated into two parcels, and with a pair of very ingenious little bone or ivory levers are twisted from the middle into two tight cables, so that the twist of the cords adds to the resistance to be overcome in drawing the bow. These are prevented from untwisting by a lashing at the middle which runs through the cable and round the bow in a sort of figure of 8. The end of the cord then makes a tight spiral seizing round the bow which not only keeps the backing from slipping, but serves to distribute the strain evenly and keep the bow from breaking. This pattern is probably the ultimate development of the sinew-backed bow. Not only is it difficult to imagine making a more perfect weapon from the material, but attention will no longer be paid to possible improvements in a weapon which is rapidly falling into disuse. As would naturally be supposed the region about Norton Sound, where the tribes of the Arctic coast meet those of Bering Sea, is a debatable ground, where bows of the two types described are found side by side, along with others partaking of the characteristics of both. If now we cross to St. Lawrence Island, we find Eskimos depending solely on driftwood, who employ another and most peculiar modification of the original type. They have lengthened the ends of the bow so that the original simple backing hardly reaches within a foot of either end, while these ends are bent up as in the Tartar bow, and separate backings are stretched across these bends.

The Eskimos of the mainland of Siberia, who have long maintained direct intercourse with the St. Lawrence Islanders and with the Eskimos of the Arctic coast by way of the Diomedes, show the evidence of this intercourse in the pattern of their bows, using either the peculiar St. Lawrence tpye, or purely American bows of the Arctic pattern, or weapons which curiously combine characteristic features of both.

DISCUSSION.

Mr. BATES said that the little blocks which are tied into the concave outer limb of several of Mr. Murdoch's bows are something more than a mere stiffener of the wooden portion. It is a truly mechanical expedient, to give efficiency to the tension member of the combination, which is the sinew. It not only acts as a strut to increase the leverage of the tension member, which is the

function of the strut in all combination trusses, but it shortens and straightens the line of the sinew, thus bringing its rigidity and elasticity into full play. In this, as in so many other instances of merely experimental evolution, the best results of abstract theory are arrived at.

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NINETY-SEVENTH REGULAR MEETING, May 19, 1885.

Vice-President Dr. ROBERT FLETCHER in the Chair.

The Chair announced the death of Count Giovanni Battiste Ercolani, of Bologna, Italy, a corresponding member, after which a memoir was read by Dr. E. R. Reynolds, who, in the course of his remarks, presented to the Society an embroidered Italian flag and a number of scarfs and mourning wreaths contributed by various scientific societies of Italy, of which Count Ercolani was a member. The Chair remarked that Count Ercolani would probably be remembered principally for his discovery that the circulation of the blood was known and promulgated prior to Harvey.

Dr. MATTHEWS then read a paper upon "THE CUBATURE OF THE SKULL," which was followed by some inquiries by Dr. Frank Baker and Mr. Bates, leading to further remarks by Dr. Matthews.

ABSTRACT.

The lecturer discussed briefly the various methods which have been employed in the volumetric measurement of the cranial contents and pointed out their various defects. He then described a method which he had recently devised and employed in the Army Medical Museum at Washington.

After recording the weight of the skull it is varnished inside with thin shellac varnish, applied by means of a reversible spray apparatus. Artificial or accidental orifices are closed with India-rubber adhesive plaster. The foramena and fossæ are filled with putty. The skull is wrapped in a coating of putty an inch or more in thickness, which renders it water-tight. It is filled with water by means of a special apparatus in forty-five seconds and emptied in fifteen seconds. The rapidity of this manipulation in conjunction with the varnishing prevents soaking into the sinuses and the undue measurement of water which does not pertain to the

cranial cavity. The water is poured into a measuring glass of 2,000 c. c. capacity, and lycopodium is scattered on the water to define the true surface. The putty is taken from the skull; the latter is cleansed and placed in a dry, warm apartment until by slow evaporation it is reduced to its former weight and consequently to its former capacity. Then it is measured a second time to verify the results of the former measurement.

Hitherto anthropologists have chiefly employed solid particles, such as shot or seeds, in the cubature of skulls. Water had been tried by former experimenters without success, and abandoned—the objections to its use being considered insuperable. The lecturer, however, considered that by his method he had overcome the chief difficulties. Although the method is new and still susceptible of improvement, it is thought that the results—an average of one cubic centimetre difference between the first and second measurements—have not been excelled.

One of the bronze skulls of Professor J. Ranke, of Munich, was exhibited, and the claims of the inventor, as published in "Correspondenz-Blatt der Deutschen Gesellschaft für Anthropologie Ethnologie und Urgeschichte," September, 1884, were quoted. The lecturer had found one difficulty in using the artificial skull which Prof. Rauke had not suggested. The cavity varied greatly in capacity with changes of temperature. For a perfect conformity of measurements not only was it necessary that the water used should be certain specified heat, but the bronze skull, the various vessels used, and the atmosphere of the apartment in which the experiments were made should be of a corresponding temperature. At 4° centigrade the lecturer obtained for the bronze skull, estimating both by weight and measure, a capacity of 1,220 c. c., while at 14° centigrade he obtained 1,240 c. c. In no case did he get a result as high as that engraved on the skull, *viz:* 1,255.6 c. c. The skull was presented by Prof. Rauke to the Army Medical Museum.

A paper followed from Dr. BAKER upon "THE PRINCIPLES OF INTERPRETATION OF BRAIN, MASS, AND FORM." This paper was illustrated by numerous charts.

# FROM SAVAGERY TO BARBARISM.

## ANNUAL ADDRESS OF THE PRESIDENT,

J. W. POWELL,

*Delivered February 3, 1885.*

It is a long way from savagery to civilization. In the attempt to delineate the progress of mankind through this long way, it would be a convenience if it could be divided into clearly defined stages. The course of culture, which may be defined as the development of mankind from savagery to civilization, is the evolution of the humanities—the five great classes of activities denominated arts, institutions, languages, opinions, and intellections. Now if this course of culture is to be divided into stages, the several stages should be represented in every one of the classes of activities. If there are three stages of culture there should be three stages of arts, three stages of institutions, three stages of language, three stages of opinions, and three stages of intellections.

Three such culture stages have been recognized by anthropologists, denominated Savagery, Barbarism, and Civilization. But they have been vaguely characterized and demarcated. Savagery has been considered a low stage of culture, barbarism a middle stage of culture, and civilization a high stage of culture. In a brief address it is not practicable to set forth the essential characteristics of the whole course of culture; and it is intended on this occasion simply to characterize Savagery and Barbarism, and to define the epoch of transition. To this end it will be necessary to set forth the characteristics of savage art as distinct from barbaric art, and the nature of the change; to explain savage institutions and barbaric institutions, and how the lower class developed into the higher; to set forth briefly the characteristics of savage language and barbaric language, and the origin of the change; to show the nature of the opinions held by savages and the opinions held by barbarians, and to explain the reason of the change from one to the other; and finally to explain savage and barbaric intellections, and to show

how savage methods of reasoning were transformed into barbaric methods of reasoning.

The most noteworthy attempt hitherto made to distinguish and define culture-stages is that of Lewis H. Morgan, in his great work entitled "Ancient Society." In it these three grand periods appear—Savagery, Barbarism, and Civilization—each with sub-divisions. Morgan recognized the importance of arts as the foundation of culture, and his "ethnic periods," as he calls them, are based on art development. With him, Savagery embraces all that stage of human progress extending from the beginning of the history of man, as distinguished from the lower animals, to the invention of pottery. Barbarism then succeeds and extends to the invention of the alphabet. He adds that among some peoples hieroglyphic writing takes the place of phonetic writing, and civilization begins at this time. He then divides each of these periods into epochs which need not here be considered. In some of Morgan's works he connects the evolution of institutions with the development of arts, but to an imperfect degree, and without explaining their interdependence. He also, at different times, hints at the relation of linguistic development to arts; but he considers mythology to be too vague to afford valuable data for this purpose.

The scheme here presented differs from Morgan's in placing the epoch of demarcation between Savagery and Barbarism later on in the course of human culture; and it is proposed to characterize the stages, not by arts alone, but by all the fundamental activities of man.

The next most noteworthy attempt to define culture-periods is that by Lester F. Ward, one of the Vice-Presidents of this Society. In his scheme there are four stages of social progress, or social aggregation, viz:

"1st. The solitary, or autarchic stage;
2d. The constrained aggregate, or anarchic stage;
3d. The national, or politarchic stage; and,
4th. The cosmopolitan, or pantarchic stage."

Ward seeks to establish these as veritable stages on the basis of institutions alone. They are treated as stages of social aggregation, and not as culture-stages. The first, second, and fourth are purely hypothetic. I have elsewhere stated my reasons for not accepting the first and second stages; but, whether real or imaginary, they antedate all possible objective knowledge of the condition of man-

kind. The fourth stage is a prophecy, and though I believe that his prophetic vision is clear and that he sees a true picture of the future, it need not be considered here. His politarchic stage embraces all the course of human culture with which science may at present deal on a basis of observed fact, and it is this stage which is here divided into three parts—Savagery, Barbarism, and Civilization.

E. B. Tylor, also, has classified the stages of culture as Savage, Barbaric, and Civilized. The lowest or savage stage he defines "as that in which man subsists on wild plants and animals, neither tilling the soil nor domesticating creatures for his food." He considers that men arrive at the barbaric stage when "they take to agriculture," and pass from the barbaric to the civilized stage by acquiring the art of writing.

In relation to the epoch which separates Savagery from Barbarism, Tylor does not greatly disagree with Morgan. Morgan uses as a criterion of Barbarism as distinguished from Savagery the acquisition of the art of making pottery; Tylor, the acquisition of agriculture. But usually the two arts have been acquired at about the same time, and it seems probable that the conditions of life brought about by agriculture were necessary properly to develop ceramic art. If this is true, agriculture is the more fundamental. If stages of culture are to be established on conditions of art development alone, the invention of agriculture should doubtless be accepted as the plane of demarcation between the two lower stages; but if the culture-stages are to be based upon characteristics derived from all the classes of human activities, the separation between Savagery and Barbarism must be placed somewhat later on. Such a plane of demarcation has been adopted by me for a number of years, both in my publications and in the discussions and expositions informally presented to this Society from time to time; and it is my purpose to make a somewhat fuller exposition of my method.

All the grand classes of human activities are inter-related in such a manner that one presupposes another, and no one can exist without all the others. Arts are impossible without institutions, languages, opinions, and reasoning; and in like manner every one is developed by aid of the others. If, then, all of the grand classes of human activities are interdependent, any great change in one must effect corresponding changes in the others. The five classes of activi-

ties must progress together. Art-stages must have corresponding institutional, linguistic, philosophic, and psychic stages.

Stages of progress common to all the five grand classes of human activities may properly be denominated Culture-Stages, and such culture-stages should be defined by characterizing all these activities in each stage. This I shall attempt to do, but in a brief way.

### ARTS OF SAVAGERY.

The very early history of mankind is covered by obscurity, through which conjecture peers at undefined forms; but when that portion of human history which rests upon a solid basis of known facts is reached, a succession of arts is discovered, each of which challenges attention and admiration. In the lowest stage of culture which comes within human knowledge, men understand the use of fire, and we may pretty fairly guess how they have learned of its utility. This early man also uses tools and implements of stone, bone, horn, wood, and clay, and by them adds skill to his hands. It is the genius of savage intellect that makes the hand more than a paw, that makes it an organ for the fashioning and the use of tools and implements. At this earlier stage man also knows how to protect himself from winds and storms and the cruel changes of the seasons by providing himself with clothing and shelter. He has also explored and experimented upon the whole realm of the vegetal world, and discovered in a more or less crude way the properties of plants, so that he knows those which are useful for food, the woods that are useful for fire, and the fibres that are useful for woven fabrics. In the same period of culture man has learned that the animals of the land and the waters are useful for food, and has discovered crude methods by which to kill and ensnare them, and has invented many simple instruments for hunting and fishing. Such is the state of the industrial arts in that stage of culture which we call Savagery.

### INSTITUTIONS OF SAVAGERY.

Institutions relate to the constitution of bodies politic, to forms of government, and to principles of law; and in describing Savagery we must characterize the constitutions of savage tribes, the forms of savage government, and the principles of savage law.

In Savagery the tribe is always a body of kindred — actual kindred in the main; but, to a limited extent, artificial kinship obtains by

methods of adoption. In this stage of society no method is conceived in the human mind by which a number of men can be held together in one common body except the bond of kinship — the ties of consanguinity and affinity. The savage thinks and says, "My kindred are my friends, and he who is not my kin is my enemy," and upon this theory he acts.

The tribal state, therefore, is organized upon the basis of kinship. It is literally a bond of blood entwined in a bond of conjugal love, and the family organization thoroughly permeates the constitution of the tribal state. In this stage of culture the family, as understood in the civilized world, is unknown. The marriage of one man to the woman of his choice, and of one woman to the man of her choice, is unknown. The right of the father to his own children, is unknown. The husband does not take the wife to his own home; the husband is but the guest of his wife, who remains with her own kindred; and the children of the union belong to her, and over her the husband has no authority. The tribe is always divided into kinship clans. Each clan of this character is a group of people related to one another through the female line, and children belong to the clan of the mother, and submit themselves to the authority of the mother's brother or the mother's uncle. The husband of a woman is selected, not by herself but by her clan, to be the guest of the clan and the father of additional members of the clan. In this form of soeiety, then, a clan is a body of consanguineal kindred in the female line governed by some male member of the clan, usually the elder man. The clans constituting the tribe are bound together by ties of affinity. The methods by which they are thus bound vary from time to time and from tribe to tribe. In the simplest possible case a tribe is composed of two clans, each furnishing the other with husbands and fathers, and in such a case the men of the one clan are the guests of the other, are the husbands of the women and the fathers of the children of the other clan. In such a case the common government is a council of the elder men of both clans, or of chosen or hereditary representatives of both clans, and the council chooses the tribal chief. Such is the simplest possible form of tribal society.

This plan of the tribal state and form of government becomes very highly developed; there may be three, four, twenty, or fifty clans, with many curious ties of affinity, with many curious relations arising from marriage laws. The clan A may furnish

husbands to clan B, and clan B to clan C, and clan C to clan D, and clan D to clan A. It will be impossible to explain all the forms of kinship society in Savagery; but it is sufficient to say that everywhere the tribal state is organized on a kinship basis.

If two tribes form an alliance for offensive and defensive purposes, an artificial kinship is always established. Under such circumstances the tribes entering into the alliance make an agreement with one another what their relationship shall be. If two tribes are thus joined they may call each other brothers; then one will be the elder-brother tribe, the other the younger-brother tribe. Or they may assume the relationship of parent and child to each other, and the men of one tribe call the men of the other "fathers" and the women "mothers," &c. But all clan relations and all tribal relations are really or theoretically kinship relations. In all such bodies politic there is a perpetual conflict between tribal and clan prerogatives, and it is settled by different methods in different tribes and at different times; but, in general, crimes are of two classes in this respect: those over which the tribe has jurisdiction, and those over which the clan has jurisdiction. Sometimes the clan assumes almost supreme jurisdiction; at other times the tribe assumes almost supreme jurisdiction. All petty crimes, as they are considered in savage society, fall under the jurisdiction of the clan. It may be asked how a state of social organization so strange to us ever became established, and yet it may be easily seen that, anterior to the development of modern ideas and methods of government, it was the simplest way of settling difficulties, establishing peace, and consolidating peoples into bodies-politic that could occur to a people.

In the 34th chapter of Genesis there is recorded a proposition to organize a barbaric tribe:

"And Hamor the father of Shechem went out unto Jacob to commune with him.
* * * * * * * *

"And Hamor communed with them, saying, The soul of my son Shechem longeth for your daughter: I pray you give her him to wife.

"And make ye marriages with us, and give your daughters unto us, and take our daughters unto you.

"And ye shall dwell with us: and the land shall be before you; dwell and trade ye therein, and get you possessions therein."

In all stages of society, laws regulate conduct in those particulars about which men disagree. Wherever there is universal agreement there is no need for law, and when men disagree about the

actions of life, their actions must be regulated. Now, in early stages of society, the chief things about which men disagree are the relations of the sexes, personal authority, possession of property, and conduct relating to mythical beings. Their laws therefore relate, first, to marriage: and they avoid controversies in this respect by establishing the law that individuals themselves shall have no personal choice in the selection of mates, but that husbands shall be furnished to wives by legal appointment through the officers or rulers of the clan. Second, property rights are established by laws which make certain classes of the property belong to the tribes, other classes to the clans, and a very small part to individuals; and the property held by individuals cannot descend to other persons; and to prevent controversy in relation to personal property, it is established by law that every man's personal property shall be placed with him in his grave. Third, personal authority is established on seniority. The elder always has authority over the younger; and as the people in this stage of society have not yet developed arithmetic and records to such an extent that the ages of individuals are known, a curious linguistic device is established by which relative age is always known. Every man, woman, and child addresses every other man, woman, and child by a kinship term which always indicates relative age: thus, there is no term for brother, but a man in speaking to his brother always uses a term which signifies that he is an elder brother or a younger brother, as the case may be; and thus, through the entire system of kinship terms in tribal society no man can speak to another without addressing him by a term which, in its very nature, claims or yields authority. The younger must always be obedient to the elder. Fourth, laws involving conduct relating to mythic beings are very diverse and multifarious, and cannot be fully characterized. But one of the most essential of those laws concerns behavior in relation to the tutelar deity. Each clan has its tutelar deity and defends its honor, and punishes all impious acts or words against its tutelar god. And in savage society no man may speak disrespectfully of his neighbor's god, but may praise or defame his own, as that god is propitious or angry.

The general principle running through all these laws is this: That in order that men may live together in peace and render each other mutual assistance, controversy must be avoided; and in connection with this first principle, a second arises and runs through savage law, viz, when controversy has begun it must be terminated.

The methods of terminating such controversy are various, and may not here be entered upon. But, in Savagery, the struggle is for peace, and peace is secured by preventing and terminating controversy. Such are the institutions of Savagery.

### THE LANGUAGE OF SAVAGERY.

It is not easy to characterize savage languages in such a manner that the subject may be clearly understood by scholars who are not specialists in philology. This is due to the fact that a false standard of linguistic excellence has been set up through the worship of Greek and Latin. These languages, at the time when they were taken as classical models, were very highly specialized, but not highly developed as compared with the languages of modern civilization. But having been taken as the models of excellence and the standards of comparison, erroneous ideas of the course of linguistic growth and of the value or excellence of linguistic methods have obtained currency. In order to understand clearly what savage, barbaric, and civilized languages are, and how they rank, it becomes necessary to eradicate these preconceived ideas, and this cannot be attempted in a short address. It can only be stated in a general way, and without hope that the statement will be fully understood, that savage languages have the parts of speech very imperfectly differentiated, that the grammatic processes and methods are heterogeneous and inconsistent, and that the body of thought which they are competent to express is greatly limited. But there is one linguistic characteristic of Savagery that may be made very clear; it is this: That simple picture-writing is found among savage peoples as a linguistic art, and that in such picture-writing conventional characters are rarely used. Hieroglyphs are never found among savage peoples, and of course alphabets are unknown.

### THE PHILOSOPHY OF SAVAGERY.

It seems probable that, in the lowest stage of Savagery, all change, motion, or activity — in fact, all phenomena — are attributed to life supposed to exist in the objects exhibiting the phenomena. Thus, all things, animate and inanimate, are supposed to have life and to exercise will. But gradually, in the development of savagery itself, the animate and the inanimate are distinguished ; and finally these ideas are usually woven into the grammatic structure of savage

languages. Still, in this stage of culture, the animate is supposed to act on the inanimate; so that while life is not attributed to all things, all action is attributed to life — that is, unseen beings are supposed to actuate all nature and to produce all the phenomena of existence. Thus it is that the stars have spirits, the mountains have spirits, and all inanimate and vegetal nature, to a greater or less extent, is the abode of invisible beings. Superimposed on this is found an exalted conception of the wisdom, skill, and powers of the lower animals. In savagery the animals are considered to be the equals of man, and in some cases even his superiors. There is also a general belief that the form in which men and animals appear is but transitory and that these forms may be changed. They believe not so much in *transmigration* as in *transformation*. Then, through the principle of Ancientism, by which the remote past is exalted — in Savagery, Barbarism, and among the ignorant in Civilization alike — the ancients of the star, mountain, and river spirits, the ancients of the birds and beasts, are deified and worshiped. The most important characteristic of savage philosophy, then, is the exaltation of the lower animals, the worshiping of these animal gods, and the belief that they are the chief actors in the creation and history of the universe. Savage philosophy is best characterized by Zoötheism.

### PSYCHIC OPERATIONS OF SAVAGERY.

Sensation is the recognition of external action upon the apparatus of the mind. When the olfactory nerves take cognizance of an odor, a sensation is received; but when the mind associates that odor with previous sensations of odor, and recognizes it as of some quality, or as belonging to some known object, it performs an act of inductive reasoning, and pronounces judgment that the odor is sweet, or that it emanates from some pleasant substance. When, therefore, we say that the odor of the rose is perceived, we fairly affirm that in that perception a train of reasoning has been pursued and a judgment formed thereon. By long exercise of the individual in the cultivation of the faculties of inductive reasoning, and by the inheritance of such faculties from ancestors, trains of reasoning of this character gradually come to be so spontaneous and so apparently instantaneous that the course of inductive reasoning is not recognized. The judgment is instantly formed, and the inductive reasoning is unconscious induction upon the data of sensation. Induction is the composition of data.

Again: a sound falls upon the ear; that is, many waves of sound beat upon the nervous receptacle which groups the sensations we call sound; the mind recognizes qualities in the sounds, and at the same time compares them with the memories of other sounds having the same quality, and the ear thus recognizes the voice of a friend. But there may be something more recognized, such as characteristics that express joy or sorrow, and the mind recognizes not only the voice of the friend but the state of his emotions. Now this process is wholly inductive, both in the perception of a known voice and in the perception of a known emotion. It is all a complex course of inductive reasoning, but that reasoning is so instantaneous that the facts which lie at the basis of induction, and the methods of induction, are not discerned, and the unconscious induction is called perception. When the eye is turned to look upon a horse it is affected by certain conditions of light, transformed by reflection from the object upon which the eye is directed. The different rays of light coming to the eye are of a multiplicity of kinds, exhibiting different degrees of light and shade and different degrees in the analysis of light into its constituent colors; thus, chiaroscuro and color strike upon the eye, the vast multiplicity of minute effects upon the eye are composed in the mind by an inductive process, and the inductive process goes beyond the composition of these facts to infer others. Perhaps the left side of the horse is turned to the eye, and the mind infers that there is a right side, that the hither side of the ear has a farther side, that beyond there is a right ear, and a right side throughout, so that the conclusion is reached that the object is characterized by bilateral symmetry. Still more than that, through that profound principle known as the correlation of parts, internal organs are inferred; it is concluded that the animal has a backbone, a heart, and other parts. All these facts, observed and inferred, are combined into a general conclusion by the mind that the object seen is a horse, and we say that a horse is perceived. Now this process of perception differs in no wise from any long and patient course of reasoning except in one characteristic, namely, that the process of reasoning is so instantaneous that the steps and methods do not arise in consciousness. The individual facts upon which the reasoning is based do not appear in severalty, but as forming integral parts of the whole; and the steps by which these observed facts are combined with previous knowledge, and reasoned upon from the basis of the principle of the correlation of parts, are unobserved.

The mind is unconscious of the facts upon which reason is based, and of the process of reasoning, but instantaneously reaches a conclusion. Thus perception is unconscious induction.

This may be further illustrated by facts familiar to all. The untrained arithmetician labors with a simple problem in addition; he steps slowly from one number to another with his eye and his mind's eye as he ascends the column; but an expert accountant glances his eye up and down the column and instantaneously states the sum; and that which was a slow inductive problem in arithmetic for the child and the ordinary adult is performed as an instantaneous process by the expert accountant; and that which was conscious induction in the one was perception in the other. In many ways and on all hands this fact may be illustrated, that perception and induction (or reflection, as it is usually called) are one and the same process in kind, but differ only in degree. *Perception is unconscious induction.*

It was necessary to explain this fundamental principle in psychology in order that we may properly characterize the psychic operations of Savagery. The psychic condition of a people can only be fully explained by setting forth fully the whole system of intellections, embracing perceptions, inductions, and inventions (or imagination, as the process of invention is more usually denominated in psychology), and also characterizing the emotions, the desires, and the purposes, so frequently denominated the "will." But it will be sufficient for our purposes here if we characterize the perceptions and inductions of Savagery; and it may be safely inferred that the imaginings, the emotions, the desires, and the purposes will correspond thereto.

Now the perceptions of Savagery are of a very rudimentary character and are greatly restricted. This can be shown in many ways, but two particulars will suffice for present purposes. The first is this, that the savage is unable to perceive a conventional meaning. He can perceive a horse, and he can even perceive the picture of a horse if its outlines are fairly drawn, but he cannot perceive a horse in a conventional character, like a hieroglyph or a written word.

Again: the savage can perceive numbers but to a very limited extent, but cannot perceive the relations of numbers; for example, he cannot add groups of numbers, as 3 to 5; but wishing to add 3 to 5, he first counts off carefully 5, and then adds the 3, one at a time — that is, he counts his addition. To subtract 3 from 8, he

subtracts one at a time until 3 are taken away, and subsequently counts the remainder to discover the 5. In like manner he cannot multiply, that is, add like groups to each other. Nor can he divide, that is, separate into like groups, but must in each case go through the process, not by considering abstract numbers, but by considering individual things, one at a time. Thus it is that in Savagery a very large field is included in conscious induction which belongs to perception in a higher stage of culture. There are many other mental characteristics of Savagery, but those given are sufficient for present purposes.

Savagery has been thus described with all the minuteness possible on such an occasion, and perhaps with sufficient thoroughness for present purposes. The savage has invented rude arts by which he obtains food, clothing, and shelter. He has invented a rude system of kinship society, with descent in the female line. He has spoken language, gesture-speech, and picture-writing, but is without hieroglyphic, syllabic, or alphabetic writing. He has a philosophy which informs conspicuous and important inanimate objects with spirit life, and which deifies the brute; and a mind whose perceptions are so slightly developed that conventional characters do not convey to him ideas, and his arithmetic is yet "counting." Such, in general, are the characteristics of all savage peoples that have been carefully studied by anthropologists. Now the question arises, how was this Savagery transformed into Barbarism; and what is that Barbarism?

In the lower stages of culture all progress rests upon the arts of life. To discover any great change in the condition of mankind we must look for the art-invention which was the efficient agency in producing the change.

If the early course of human progress be surveyed for the purpose of discovering the most important art-epochs, it will be safe to regard those of the greatest importance the effects of which are most clearly exhibited in the concomitant activities — that is, institutions, languages, opinions, and psychic operations. If an invention has but slight influence on these correlative activities, its importance may be questioned. But if an art-invention is discovered to have worked radical changes in all other activital departments, such art must be of the highest importance.

There are two arts intimately associated the invention of which causes a radical change in all of the departments of humanity,

viz, agriculture and the domestication of animals. Agriculture began in Savagery. Many savage tribes cultivate little patches of ground and thereby provide themselves with a part of their subsistence. This petty agriculture does not of itself result in any radical change; but when the art has developed to such an extent that the people obtain their chief subsistence therefrom, and especially when it is connected with the domestication of animals, so that these are reared for food and used as beasts of burden, the change for which we seek is wrought. It seems that extensive agriculture was first practiced in arid lands by means of artificial irrigation. In more humid lands the supply of food is more abundant, and the incentive to agriculture is less. On the other hand, agriculture is more difficult in humid lands than in arid lands. The savage is provided with rude tools, and with them he can more easily train water upon desert soils than he can repress the growth of valueless plants as they compete for life with those which furnish food. The desert soil has no sod to be destroyed, no chapparal to be eradicated, no trees to be cut down, with their great stumps to be extracted from the earth. The soil is ready for the seed. Throw upon that soil a handful of seed and then sprinkle it with a few calabashes of water once or twice through the season, and the crop is raised; or train upon a larger garden patch the water of a stream and let it flood the surface once or twice a year, and a harvest may be reaped.

Petty agriculture, such as I have described as belonging properly to Savagery, has been widely practiced in the four quarters of the globe among savage peoples, quite as much in humid as in arid regions; but the art seems not to have indigenously extended beyond that stage in any but arid regions. The earliest real agriculture known to man was in the Valley of the Nile, an almost rainless land; but the floods of the Nile were used to fertilize the soil. Again, in the land of Babylon, along the Tigris and the Euphrates, extensive agriculture grew up, but it was dependent upon artificial irrigation. Still farther to the southeast, in the Punjab, another system of indigenous agriculture was developed by utilizing the waters of the five great rivers. Still farther to the east an indigenous agriculture was developed on an extensive scale, all dependent upon artificial irrigation, as the Chinese use the waters of the Ho-ang-ho and the Yang-tse-Kiang. In South America the first system of agriculture was developed in Peru, all dependent upon artificial

irrigation; and finally, to the north of the Isthmus of Panama, in Central America and Mexico, agricultural arts were highly developed, and here also they were dependent upon artificial irrigation. From these six examples of high agricultural art, all the agriculture of the world has been developed; from these centers it has spread. The petty agriculture of humid lands never went beyond the utilization of little patches of ground in the forest glades until it was borrowed in a higher state from arid lands. Everywhere with the development of agriculture in the arid lands, the art of domesticating animals was associated, and everywhere such animals were raised for food, and to a large extent they were used as beasts of burden.

Now, it is to be noted that the animal industry eventually developed beyond the vegetal industry, and spread more widely, and many tribal peoples became herdsmen and nomads before they came to be agriculturists. The art of domesticating animals was more easily borrowed, especially in humid regions, than was the art of agriculture.

These industries enabled mankind to obtain a far more generous subsistence and more thorough protection from unfriendly nature. They thus caused a great increase in population. They also constituted the first great agency for the accumulation of wealth, by creating it in giving value to land, by creating it in flocks and herds, and by storing it through the discovery of methods by which the wants of the future could be met. By planting fields the wants of to-morrow and all the days of the year to come are served; and when the young of animals are reared, provision for future years is made, and thereby men learn to accumulate.

This change in the arts of life, and the increase of population resulting therefrom, entirely changed the constitution of society. In savage society, when mother-right prevails, a tribe is a group of classes or clans living together in a village that is easily moved from time to time. If a colony departs from a tribe, a segment of two or more clans goes away and starts a new village, and the clans again live as a village community upon the same plan as the parent tribe.

Now, let us suppose that a tribe separates by clans, so that each goes off by itself; a curious condition arises therefrom: first, it results in the divorce of all marriages, because husband and wife are always of different clans; and for the same reason the father is

separated from his children. In such communities there is often a partial separation by clans of this nature: in savage society the men of a clan often go off together on a hunting or fishing excursion. Sometimes these excursions or travels are prolonged for weeks or months. In such cases the men often take their wives with them, and under these circumstances the women are separated from their clan and kindred and are not under the control of clan authority, but fall under the temporary control of their husbands and fathers. Now, if we could suppose a state of affairs where this separation of women and children from kindred and clan authority becomes permanent, it is manifest that the power of clan authority would wane, and the authority of the husband and father would grow. Such a condition of affairs results from extensive agriculture by irrigation and the care of extensive flocks. It must be remembered that in this stage of society property is communal; that is, property in the main belongs to the clan. A flock of sheep, a herd of cattle, a band of horses, is the property of the men of a clan. When such property becomes so large that it will occupy for its sustentation a large valley, the men to whom it belongs will necessarily be occupied all the time with its care and protection, and they must have their wives and children with them in order that domestic life may be possible. Under such circumstances it results that women and children are gradually taken from the control of those persons who had previously been supposed to be their natural protectors, their clan kindred, and fall under the control of their husbands and fathers, who are members of other clans. The same result has always been produced by the segregation of the male members of the clan from the tribe through agriculture by irrigation. The circumstances are these: In this early agriculture the agricultural implements are very crude, and great hydraulic works cannot be undertaken. It is thus necessary to attempt the control of only the small streams, and the men of each clan will therefore select some small stream and occupy the little valley through which it runs and upon which its waters are trained; the men of one clan, with their wives and children, occupy a distinct valley, the male members of another clan another valley, and the tribe is thus segregated into groups, the male members of each group belonging to the same clan and having with them their wives and children. The women and children being thus severed from clan authority, fall under the authority of their husbands, and mother-

right, or descent in the female line, is changed into father-right, or descent in the male line; and thus is established the patriarchy, a form of society with which we are all familiar, as it is very clearly set forth in the post-Noachian history of the Bible.

Under this form of society kinship bonds are still preserved, but they are of a different nature. First, descent is transferred to the male line—that is, children belong to the clan of the father, and are controlled by him instead of by the mother's brother, or the mother's uncle; second, the husband is no longer the guest of the wife and her clan. At first the wife is the guest of the husband and his clan, but gradually this relationship of guest and host is changed to the relationship of master and owner, and the husband becomes the owner of his wife, and finally the owner of his children. They are considered to be his property; they are responsible to no one but himself—that is, the tribe does not hold the wife and children responsible for their acts, but holds the husband responsible for them. (It is impossible in an evening's address to characterize fully the causes and the consequences of the change from enatic to agnatic descent, but the statement here given is perhaps sufficient for present purposes.)

Another great change is effected, the increase of wealth which has been described multiplies the relations between men arising from the possession of property. And these are relations about which men disagree, and therefore they must be regulated by law. The state, therefore, comes to be organized in part on a property basis; hitherto it has been organized wholly upon a kinship basis. The plan of the structure of the state is thus changed. The laws, too, are enlarged to regulate the relations that arise out of ownership.

And yet another change is effected. Some clans prosper and increase in wealth; other clans fall into poverty. With this increase of wealth and desire for wealth, labor becomes of value, because it can be converted into wealth, and the poor are employed by the rich, and the relations of the employer and the employed are established. Out of this grows the relationship of master and slave, and ranks or grades are established in society. With this grows ambition for wealth and power, and tribe wars on tribe to drive away its herds and to take possession of its accumulated property, and captured peoples become slaves, and the chiefs of conquering tribes extend their authority over conquered tribes, and gradually great

chiefs become great leaders in war and gather their retainers about them, giving to them protection from without, and claiming in compensation for the same fealty, tribute, and service under arms.

Such is a brief outline of the characteristics of tribal society in barbarism, brought about through the cultivation of the soil and the domestication of animals.

### THE CHANGE IN LANGUAGE.

The great changes wrought in arts and institutions which have been described doubtless had their influence on languages, as the new ideas required new means of expression. While in the present state of knowledge it is perhaps not possible to set forth clearly the resultant sematic and structural effects upon any language, in linguistic arts important effects are discovered.

In the lower status of culture, here denominated savagery, picture-writing was highly developed; but in the transition to barbarism, picture-writing was transformed into ideographic writing. In the earlier stage a slight tendency to conventionalism is discovered; but in ideographic writing the original pictorial signs are conventionalized to such a degree that it becomes an important linguistic art, by which ideas may be recorded and transmitted from person to person and from generation to generation. It must be understood that the evolution of picture-writing had all along been in the direction of ideographic writing, but a great impulse is given to this tendency by the enlargement of human activities in the arts of life and the institutions of society. This is discovered in many directions, the chief of which may be here enumerated.

1st. The increase of property demands increase in the methods of identifying property and of substantiating ownership.

2d. The separation of clans and the distribution of cognate peoples over large areas of territory demand means of intercommunication other than that of direct oral conversation; and

3d. Nomadism, which is the direct result of the domestication of animals, makes men travelers, and so enlarges their horizon of observation that some method for the record of events becomes necessary. Under such stimulus, picture-writing speedily develops into ideographic writing.

### THE CHANGE IN PHILOSOPHY.

In savagery, mythology develops into a high form of zoötheism.

The beasts are not gods, but many of the gods are beasts—the ancients of beasts, the prototypes or progenitors of the living animals. The rudiments of physitheism also exist in the worship of the heavenly bodies, the winds, and other natural phenomena personified.

When animals become beasts of burden they are degraded; they are discovered to be inferior beings, and the mysteries of animal life are largely dispelled; and by the development of agriculture man becomes more dependent upon the sun, the seasons, and the weather. The heavenly bodies and meteorologic powers and phenomena grow in importance and become more and more the subject of interest and speculation, until the personifications of natural objects in the heavens and natural phenomena in the seasons and the weather are deified, and the tribal worship presided over by medicine-men and prophets becomes a religion based upon physitheism. The occult lore of the people is composed of stories of the sun, moon, and stars; of thunder, lightning, and the rainbow; of the storms, clouds, and winds, and of dawn and gloaming.

There is another important development in the religion of barbaric peoples. With the establishment of the patriarchy the patriarch comes gradually to be the great power, and worship of a clan tutelar deity is changed into ancestral worship—the worship of the ancient chiefs or patriarchs; ancestor gods and ancestral worship replace tutelar gods and tutelar worship. Barbarism, then, is properly characterized by domestic ancestor worship and tribal nature worship.

### THE PSYCHIC CHANGE.

The enlarged plane of human activities already outlined causes an important development in psychic activities. First, perception is enlarged. This is seen in the fact that people at this stage are able to read hieroglyphs; they can perceive meanings in conventional characters. Again, stimulated by the accumulation of wealth, arithmetic is developed beyond the counting stage, and man can add a number of units to a number of units, and can subtract numbers from numbers, and divide numbers by numbers. In savagery, men learn to count; in barbarism, men learn arithmetic, and can at once perceive the simpler relations of numbers. The entire field of human thought is greatly enlarged, and with this enlargement there may be observed a nicer discrimi-

nation of phenomena, and a grouping of phenomena on a new system of analogies.

From the foregoing brief characterization it will be seen that barbaric culture implies a somewhat high state of agriculture and the domestication of animals, one or both. It implies that patriarchal institutions have been organized, that descent is in the male line, that ranks in society have been established, and that new laws regulating property have been enacted. It implies that the people use hieroglyphs. It implies that domestic worship is ancestral worship, that tribal worship is based on physitheism, and that the phenomena of the universe are attributed to nature gods. And finally, it implies that men can perceive meanings in conventional signs, and that arithmetic has been invented.

The statement I have hitherto made rests on the postulate that the progress of culture has been essentially along the same line in all times and places. The facts accumulated by the researches of modern anthropologists fairly establish this. It is true there has been much variation in the order and steps of culture, but this variation has been confined within certain limits. The chief variation lies in the fact that all races have not made progress to the same extent. Some tribes are yet savages; other tribes are yet barbarians; and some peoples have attained civilization.

The common origin of mankind, otherwise denominated the unity of the human race, is a conclusion to which the modern science of anthropology gives abundant evidence. Although the diversity among men is so great that no two are alike, yet this diversity is restricted to narrow limits. The units of the mass of humanity are discovered to be homogeneous in essential endowments to such an extent as almost to startle the student who studies man in all lands and at all times.

Primitive men had a common origin, but early in their history they differentiated into biotic varieties, characterized by the conformation of the skull, the proportions of the skeleton, the color of the skin, the structure of the hair, the attitude of the eyes, and other biotic peculiarities. Had this tendency to differentiate continued through the entire course of human culture, species would have been established, but early in the period of human history the tendency to differentiation was checked and a return to homogeneity initiated. Thenceforth the progress of mankind has been by methods radically differing from the methods of biotic evolution as exhibited among plants and animals.

This return to biotic homogeneity is due to the development of human activities, which make men depend one upon another in such a manner that the welfare of one involves the welfare of others, so that no man may claim the right to live for himself, but every man lives and labors for the good of his kind. The fundamental principle of animality is supreme selfishness; the fundamental principle of humanity is mutual assistance.

As man is an animal, in systematic biology he may be grouped with other animals as determined by morphologic characteristics. He has a head, body, and limbs; he has organs which perform the functions of biotic life; and when we consider man in this aspect the study is a part of biology. Man is more than animal by reason of his activities; man is man by reason of his humanities; and when we study him in this aspect the subject is anthropology.

Henceforward human evolution differs radically from biotic evolution as exhibited among plants and animals. Animal evolution has been accomplished by the survival of the fittest in the struggle for existence. By this method animals were adapted to environment, and in the course of this adaptation they differentiated into a multitude of species, genera, families, and orders. Animal evolution, then, has these three characteristics: first, the agency of evolution was the survival of the fittest in the struggle for existence, brought about by over-population; second, the fittest that survived were adapted to environment; and third, progress resulted in immeasurable variety, carried to the utmost degree. In all of these characteristics human evolution differs radically from animal evolution.

First, man has not progressed by the survival of the fittest in the struggle for existence. Man does not, to any important extent, compete with plants and the lower animals, but he utilizes them, developing such as he will in directions that best subserve his interests, and gradually destroying others from the face of the earth. Nor does man progress by reason of competition within the species. When the highwayman and the traveler meet, the robber is not always killed; and when races battle with each other, the strongest and the best go-to die. In the course of human history, in a few localities and at a few times population has been overcrowded, but in the grand aggregate the world has never been fully peopled, and man has not crowded upon man for existence.

While man has not progressed by the struggle for existence, he

has progressed by his endeavor to secure happiness; and in this endeavor he has invented arts, institutions, languages, opinions, and methods of reasoning — that is, he has progressed by the development of five great classes of human activities. In the establishment of these activities, he transfers the struggle for existence from himself to his activities, from the subject, man, to the objects which he creates. Arts compete with one another, and progress in art is by the survival of the fittest in the struggle for existence. In like manner, institutions compete with institutions, languages with languages, opinions with opinions, and reasoning with reasoning; and in each case we have the survival of the fittest in the struggle for existence. Man by his invention has transferred the brutal struggle for existence from himself to the works of his hand.

Again, man has not been adapted to environment. There is no aquatic variety of man, no aërial variety, no tropical variety, no boreal variety, no herbivorous or carnivorous variety. On the other hand, man has adapted the environment to himself — that is, he has created for himself an artificial environment by means of his arts. He can sail upon the sea and live on the products of the sea, and he utilizes the denizens of the air and the plants and animals of the land. He protects himself from great heat and great cold and in a multitude of ways creates an artificial environment. And this he has done to such an extent that were he suddenly to lose his control over the environment gained through his arts, he would speedily perish from the earth.

Again, among the lower plants and animals the course of adaptation to environment led progressively to the differentiation of species, until a multiplicity of biotic forms covered the earth. The method of human evolution by endeavor to secure happiness through human activities, which resulted in the creation of an artificial environment, checked the tendency of the animal man to differentiate into distinct species, and the interdependence and solidarity that were established through these activities tend more and more to restore the units of mankind to pristine homogeneity. This is accomplished biotically by a constant interfusion of streams of blood, as men are commingled and intermarried throughout the world. When races of higher culture spread civilization over inferior races, the admixture goes on at an increased rate. The blood of the American Indian is to a large extent mixed with the blood of the European, and especially is this true where Latin peoples

have established themselves. The African tribes transplanted in America are rapidly bleached by the synthetic chemistry of social life. When three generations more have passed, it may not be possible to find a drop of pure Indian or negro blood on this continent. Civilization overwhelms Savagery, not so much by spilling blood as by mixing blood, but whether spilled or mixed, a greater homogeneity is secured.

This return to homogeneity is accomplished by the spread of arts from their centers of invention to the circumference of their utilities. As an art is expressed in material form, it is an object-lesson readily learned. It may be that the tongue of the inventor can be understood by no people but those of his own tribe, but his handiwork needs no interpreter; and so arts are spread from land to land, and those who engage in common arts are trained by homogeneous methods.

This return to homogeneity is accomplished by the spread of institutions from tribe to tribe and from nation to nation, for waves of conquest have rolled again and again over all lands, and when civilization is reached institutions and institutional devices are transplanted, for civilized men are ever engaged in comparison and ever striving to select the best.

This tendency to homogeneity is accomplished by linguistic communication, for with the progress of culture men come to speak more and more in synonyms, and dominant languages are spread far beyond the boundaries of their native lands; and thus there is a tendency to homogeneity of tongue.

This return to homogeneity is accomplished by the spread of opinions, for the opinions that influence the highest of the race come ultimately to influence all; and scientific philosophy is rapidly spreading to the uttermost parts of the earth.

And finally this homogeneity is accomplished by the spread of the same methods of reasoning, the same psychic operations. Homologic methods of reasoning, by which the truth is reached, are steadily replacing analogic methods, by which myths only are invented; and as gradually the same facts are brought to the light of all mankind, and the same processes of reasoning are pursued, men are gradually becoming occupied in the same mental activities.

Thus it is that if we consider man biologically, or man in relation to his activities, expressed in arts, institutions, languages, opinions, and reasoning, we discover that the tendency to the differentiation

of species has been checked, and that a tendency to homogeneity has been established.

To recapitulate: Human evolution has none of the characteristics of animal evolution. It is not "by the survival of the fittest" in the struggle for existence, but it is by human endeavor to secure happiness; and in this endeavor man has transferred the struggle for existence from himself to the works of his hand and mind. It is not by adaptation to environment, but by the creation of an artificial environment. It does not secure differentiation into varieties and species, but establishes a tendency toward homogeneity.

By the division of labor men have become interdependent, so that every man works for some other man. To the extent that culture has progressed beyond the plane occupied by the brute, man has ceased to worked directly for himself and come to work directly for others and indirectly for himself. He struggles directly to benefit others, that he may indirectly but ultimately benefit himself. This principle of political economy is so thoroughly established that it needs no explication here; but it must be fully appreciated before we can thoroughly understand the vast extent to which interdependence has been established. For the glasses which I wear, mines were worked in California, and railroads constructed across the continent to transport the product of those mines to the manufactories in the East. For the bits of steel on the bow, mines were worked in Michigan, smelting works were erected in Chicago, manufactories built in New Jersey, and railroads constructed to transport the material from one point to the other. Merchant-houses and banking-houses were rendered necessary. Many men were employed in producing and bringing that little instrument to me. As I sit in my library to read a book, I open the pages with a paper-cutter, the ivory of which was obtained through the employment of a tribe of African elephant-hunters. The paper on which my book is printed was made of the rags saved by the beggars of Italy. A watchman stands on guard in Hoosac Tunnel that I may some time ride through it in safety. If all the men who have worked for me, directly and indirectly, for the past ten years, and who are now scattered through the four quarters of the earth, were marshaled on the plain outside of the city, organized and equipped for war, I could march to the proudest capital of the world and the armies of Europe could not withstand me. I am the master of all the world. But during all my life I have worked for other men, and thus I am

every man's servant; so are we all—servants to many masters and masters of many servants. It is thus that men are gradually becoming organized into one vast body-politic, every one striving to serve his fellow man and all working for the common welfare. Thus the enmity of man to man is appeased, and men live and labor for one another; individualism is transmuted into socialism, egoism into altruism, and man is lifted above the brute to an immeasurable height. Man inherited the body, instincts, and passions of the brute; the nature thus inherited has survived in his constitution and is exhibited along all the course of his history. Injustice, fraud, and cruelty stain the pathway of culture from the earliest to the latest days. But man has not risen in culture by reason of his brutal nature. His method of evolution has not been the same as that of the lower animals; the evolution of man has been through the evolution of the humanities, the evolution of those things which distinguish him from the brute. The doctrines of evolution which biologists have clearly shown to apply to animals *do not apply to man.* Man has evolved because he has been emancipated from the cruel laws of brutality.

The evolution of man is the evolution of the humanities, by which he has become the master of the powers of the universe, by which he has made life beautiful with æsthetic art, by which he has established justice, by which he has invented means of communication, so that mind speaks to mind even across the seas; by which his philosophy is the truth of the universe. Man is man because of the humanities.

# INDEX.