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ADDRESS
BEFORE THE
ROCKY MOUNTAIN
MEDICAL ASSOCIATION

JUNE 6, 1877

CONTAINING
SOME OBSERVATIONS
ON THE

GEOLOGICAL AGE OF THE WORLD

THE APPEARANCE OF ANIMAL LIFE UPON THE GLOBE,
THE ANTIQUITY OF MAN, AND THE ARCHÆOLOGICAL
REMAINS OF EXTINCT RACES FOUND ON THE AMERICAN CONTINENT,
WITH VIEWS OF
THE ORIGIN AND PRACTICE OF MEDICINE AMONG
UNCIVILIZED RACES, MORE ESPECIALLY
THE NORTH AMERICAN INDIANS.

BY
J. M. TONER, M. D.

WASHINGTON, D. C.
PUBLISHED FOR THE ASSOCIATION
1877.

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DR. CHARLES RAU was born in Belgium in 1826. He came to the United States in 1848, and was engaged as teacher at Belleville, Illinois, and in New York. In 1875 he accepted an invitation from the Smithsonian Institution to prepare an Ethnological Exhibit to be displayed at the Centennial Exhibition, and subsequently was appointed Curator of the department of Archæology in the National Museum, which position he held at the time of his death, July 25, 1887. He bequeathed his Archæologic collections and library to the U. S. National Museum.

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P R E S I D E N T S
O F T H E
R O C K Y M O U N T A I N M E D I C A L A S S O C I A T I O N.

W. L. ATLEE, M. D.,	.	.	.	.	.	.	1872-1873
B. H. CATLIN, M. D.,	.	.	.	.	.	.	1874
G. W. MEARS, M. D.,	.	.	.	.	.	.	1875
B. GILLET, M. D.,	.	.	.	.	.	.	1876
J. M. TONER, M. D.,	.	.	.	.	.	.	1877
N. S. DAVIS, M. D.,	.	.	.	.	.	.	1878

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[EXTRACT FROM THE MEMORIAL VOLUME OF THE R. M. M. A.]

INTRODUCTION.

THE Rocky Mountain Medical Association had its origin in a desire to perpetuate and keep fresh the friendships formed among the physicians who actually crossed the Rocky Mountains to attend the meeting of the American Medical Association in San Francisco, California, in May, 1871. On that occasion there were one hundred and twenty-three physicians who traversed the Continent for this purpose, all of whom have been constituted members of the Association. The ladies of the party and a few non-professional gentlemen who were in the company are recognized as honorary members. The organization is entirely social and memorial in its character. It meets annually at the same time and place as the American Medical Association. The meeting of 1877 was organized on the evening of the 6th of June, in the reading room of the Palmer House in Chicago. After the transaction of the routine business, the president, Dr. Toner, read his address, at the conclusion of which a resolution was unanimously passed that it and the accompanying biographical sketches of the members be published by the Association. The committee appointed for that purpose takes pleasure in presenting to the members of the Rocky Mountain Medical Association this admirable discourse and desirable record in a handsome memorial volume as an appropriate souvenir of friendship.

Committee on Publication :—

N. S. DAVIS, M. D.,
J. MORRIS, M. D.

* * * *

ADDRESS.

GENTLEMEN OF THE

ROCKY MOUNTAIN MEDICAL ASSOCIATION :

It has been our privilege to meet this year in the inland metropolis of the United States, the city of Chicago, one of the greatest marvels presented in history. Located but half a century ago, deep within the western wilds, on the hunting-grounds of the red man, not only in its sudden rise and commercial importance did it seem more like enchantment than the work of man, but when a mighty conflagration had almost extinguished its early greatness, rising Phœnix-like from its ashes, it has shown even more conclusively in its restoration and increased grandeur the irresistible energy and enterprise of its people.* It is fitting at

*The first United States military post was established at Chicago in 1804. Settlers began to locate around the fort shortly after the close of the war of 1812.

The city of Chicago was incorporated in 1837. Its population had reached 298,977 in 1870. The most disastrous conflagration of modern times took place there on the 8th and 9th of October, 1871. The fire fiend raged uncontrolled for thirty-six hours, in the heart of the city, and burned over 2,124 acres, equal to nearly three and one-third square miles—destroying 17,450 buildings, the homes and possessions of 98,500 people. Property to the value of \$196,000,000 was destroyed. Relief sent to the sufferers from all parts of the world exceeded \$7,000,000, and 8,000 temporary buildings were erected by the relief committee to shelter the homeless, who were supplied with food by the

the beginning of the second century of our national independence that this city, so typical of American progress, and at the same time the adopted home of the Father* of the American Medical Association, should be the meeting-place of the society which he originated, and which he has watched over with such rare fidelity and judgment, until it has become a beacon that may guide and ethically enlighten every physician of the country who desires to earn honorable distinction and promote the dignity of the profession.

The organization which assembles us this evening is, as you know, an emanation of the heart, and is alone social and memorial in its purpose, and owes its existence to the friendships formed among the physicians residing east of the Rocky Mountains who in 1871 attended the meeting of the American Medical Association in the city of San Francisco.

We had often read and heard the expression, "from the Atlantic to the Pacific Ocean," when it was desired to emphasize the extent and resources of our country. On that occasion we realized the import of this expression, but never until then did we comprehend it in its fullness. To most of us, busy, hard-worked physicians, the rest of a month or more from professional duties, with an opportunity for even a casual inspection of some of the more notable topographical features of the United States, such as its great mountain ranges, its water-courses, and particularly its extensive table-

authorities. The city has now entirely recovered, has a larger trade than ever, and many millions more of assessed property than before the fire.

* N. S. Davis, M. D.

lands, was a circumstance of interest. From the Atlantic coast, across the Alleghany Mountains, until we reached Chicago, the eye was chiefly employed in observing the improvement in agricultural and rural residences, the growth of villages, and the founding of prosperous towns and cities. From Chicago to the crossing of the Missouri River, at Council Bluffs, the broad prairies, the numerous water-courses, the busy mills, the growing towns, the opening farms and new settlements, commanded our utmost attention. Up the Platte River from Omaha, across the Rocky and the Wahsatch Mountains, through the Weber Cañon, traversing the valleys of Utah and the Humboldt, through many tunnels, across numerous bridges, and under miles of snow-sheds, and over the Sierra Nevada range, before entering the valley of the Sacramento—throughout all this journey the works of man, though considerable, seemed insignificant, when compared with the broad expanse of unoccupied country spread out on all sides to a seemingly boundless extent. From the city of Sacramento to San Francisco new settlements were constantly in view, and much of the land was under cultivation.

In California, a community but a quarter of a century old, we met resident brethren of high culture and marked professional ability, and we found medical institutions, which though young, yet, through the talent and energy brought to their support, might well bear comparison with those of similar character in the older States of the Union. There, too, we met *confrères* from twenty-four States and Territories lying east of the Rocky Mountains, and all were welcomed

as friends by the warm-hearted and generous physicians of California.

To those who had traveled but little, the extent of unoccupied territory traversed in crossing the continent was truly surprising. Fortunately, the journey was not only performed in luxurious palace-cars, but it was made without interruption or accident, and in the company of cultivated persons, thus giving ample leisure to make observations and to exchange views and reflections. The tediousness which ordinarily attends such a journey was in this instance entirely absent, owing to the presence of so many charming ladies, the wives and daughters of physicians. I but express the general sentiment when I acknowledge our great indebtedness to the ladies for much of the pleasure of the trip.*

* All the ladies who accompanied physicians to California have been accepted as honorary members of the Rocky Mountain Medical Association. A few gentlemen, not physicians, who traveled in company with us were also accepted as honorary members. The following list contains the names and residences of most, if not all, the ladies. If any have been omitted, it has occurred from inadvertence or want of data.

Allman, Mrs. Mary, of Wheeling, W. Va., accompanied by Dr. J. Frissell.

Atkinson, Mrs., of Philadelphia, Pa., accompanied by her son, Dr. W. B. Atkinson.

Atlee, Miss M., of Philadelphia, Pa., accompanied by her father, Dr. W. L. Atlee.

Brown, Mrs. R., of Bellefontaine, Ohio, accompanied by her husband, Dr. B. S. Brown.

Catlin, Mrs. A. D., of West Meriden, Conn., accompanied by the husband, Dr. B. H. Catlin.

Cooper, Mrs. A. A., accompanied by her father, Dr. J. W. Russell

Courtenay, Mrs., and two daughters, Miss Nellie and Miss Emma, of Louisville, Ky., accompanied by Dr. D. W. Yandell.

The meeting of the Medical Association was well attended, and the business brought before it duly con-

Crook, Mrs. General, accompanied by Dr. J. Frissell.

Deleplane, Mrs. L. S., and daughter, Miss E., of Wheeling, W. Va., accompanied by Dr. J. Frissell.

Denig, Mrs. L. B., of Columbus, Ohio, accompanied by her husband, R. M. Denig.

Donohoe, Mrs., of Sandusky, Ohio, accompanied by her husband, Dr. H. J. Donohoe.

Elliston, Miss Lezinka, of Nashville, Tenn., accompanied by Dr. D. W. Yandell.

Epler, Mrs. H. L., of Cleveland, Ohio, accompanied by her father, Dr. A. H. Agard.

Frissell, Mrs., of Wheeling, W. Va., accompanied by her husband, Dr. J. Frissell.

Golding, Mrs. A. J., of St. Louis, Mo., accompanied by her husband, Dr. W. S. Golding.

Grub, Mrs. J., of Wheeling, W. Va., accompanied by Dr. J. Frissell.

Helm, Mrs. M., and daughter, Miss Maud, of Peru, Ind., accompanied by her husband, Dr. J. H. Helm.

Hibbard, Mrs. E. M., of Richmond, Ind., accompanied by her husband, Dr. J. F. Hibbard.

Hughes, Mrs. A. T., of Keokuk, Iowa, accompanied by her husband, Dr. J. C. Hughes.

Ives, Mrs. B. W., of New Haven, Conn., accompanied by her husband, Dr. C. L. Ives.

Jarvis, Miss Mary, of Louisville, Ky., accompanied by Dr. D. W. Yandell.

King, Mrs., of Lancaster, Pa., accompanied by her husband, Dr. George A. King.

King, Miss Ann, of Pittsburgh, Pa., accompanied by her father, Dr. J. King.

McArthur, Mrs., of Rockford, Ill., accompanied by her husband, Dr. A. L. McArthur.

McMeans, Mrs. A. C., of Sandusky, Ohio, accompanied by Dr. H. J. Donohoe.

Mendenhall, Mrs. E., of Cincinnati, Ohio, accompanied by her husband, Dr. G. Mendenhall.

sidered and disposed of, in the allotted four days. The members were in the meantime entertained in the most hospitable manner, both by the profession and by private citizens. The main purpose of our visit to the

Moore, Mrs. S. A., of St. Louis, Mo., accompanied by her husband, Dr. J. S. Moore.

Moorhead, Miss Jennie, of Pittsburgh, Pa., accompanied by Dr. J. King.

Morris, Mrs. C. C., of Baltimore, Md., accompanied by her husband, Dr. J. Morris.

O'Donnell, Mrs. S. E., of Baltimore, Md., accompanied by her husband, Dr. D. A. O'Donnell.

Roberts, Mrs., of Fort Madison, Iowa, accompanied by her husband, Dr. A. C. Roberts.

Rogers, Miss Maggie, of Wheeling, W. Va., accompanied by Dr. J. Frissell.

Smith, Miss, of Philadelphia, Pa., accompanied by her father, Dr. F. G. Smith.

Stanley, Mrs. L. A., of Sandusky, Ohio, accompanied by her husband, Dr. E. Stanley.

Stevens, Mrs. L. R., of Three Rivers, Mich., accompanied by her husband, Dr. S. L. Stevens.

Stormant, Mrs. Jane Cree, of Topeka, Kans., accompanied by her husband, Dr. D. W. Stormant.

Swett, Mrs. R., of Newport, N. H., accompanied by her husband, Dr. J. L. Swett.

Thomas, Mrs. F., of Bellefontaine, Ohio, accompanied by her husband, Dr. W. Thomas.

Thompson, Miss W., of Louisville, Ky., accompanied by Dr. D. W. Yandell.

Wise, Mrs. K. B., of Covington, Ky., accompanied by her husband, Dr. T. N. Wise.

Yandell, Mrs., of Louisville, Ky., accompanied by her husband, Dr. D. W. Yandell.

Hoffman, C. J., Esq., of Philadelphia, Pa.

Johnson, James L., son of Dr. J. B. Johnson, of St. Louis, Mo.

Mendenhall, Lawrence, son of Dr. Geo. Mendenhall, of Cincinnati.

Smith, Dr. Joseph A. and wife, of Fort Madison, Iowa.

White, J. P., Jr., Esq., of Buffalo, N. Y.

Pacific was thus happily concluded; but, cherishing a lively recollection of the friendships formed on the journey and during our sojourn, the desire was spontaneous and irresistible among the physicians from the East to take some measure for perpetuating a remembrance of the occasion as long as any of us, the participants, might survive. Thus was formed the Rocky Mountain Medical Association.*

As the membership is limited to the physicians who actually crossed the Rocky Mountains to attend the National Medical Convention in May, 1871, it is evi-

* The Rocky Mountain Medical Association originally consisted of 123 members. Of these 19 are now deceased. The greatest age attained by any deceased member was 74 years. The youngest was, at the time of his death, 32. The average age of the 19 deceased is 58 years. Of those living, the oldest is 76 and the youngest 31 years. Of the 99 living members whose ages have been ascertained, the average is 53+ years. Five members have not responded to inquiries.

The members represent graduates from 25 American medical colleges; of whom Jefferson Medical College claims 19; the University of Pennsylvania, 16; the College of Physicians and Surgeons of New York, 9; the Ohio Medical College, 8; University of New York, 7; the Cleveland Medical College, 7; Harvard, 6, and the Rush Medical College, 6; the other colleges, five or below.

The States furnished delegates as follows: Alabama, 1; Colorado, 3; Connecticut, 7; Delaware, 1; District of Columbia, 1; Illinois, 9; Indiana, 8; Iowa, 4; Kansas, 1; Kentucky, 3; Maryland, 2; Massachusetts, 4; Michigan, 4; Missouri, 4; Minnesota, 4; Nebraska, 1; New Hampshire, 2; New Jersey, 3; New York, 13; Ohio, 18; Pennsylvania, 21; Rhode Island, 2; Vermont, 2; West Virginia, 4; Wisconsin, 2.

The birthplace of the 118 members has been ascertained: Connecticut, 8; Georgia, 1; Illinois, 3; Indiana, 2; Kentucky, 1; Maryland, 2; Massachusetts, 8; North Carolina, 4; New Hampshire, 4; New Jersey, 4; New York, 18; Ohio, 13; Pennsylvania, 30; Rhode Island, 1; Tennessee, 3; Vermont, 7; Virginia, 3; South Carolina, 1; Austria, 1; Germany, 1; England, 2; Ireland, 1. Not learned, 5.

dent that, in the natural order of things, our numbers must gradually decrease, and ere many years the Association will cease to exist, except in history. Already nearly one-seventh of the original number have been translated to another sphere of existence.*

* While it is true that a few of our members are now in the May-day of life, yet the majority have passed their meridian, and a few are well up in the seventies. I am happy to say, however, that from a recent correspondence with them I am enabled to state that, with but very few exceptions, they are all in the enjoyment of as good health and surrounded by as many of the comforts of this world as could be reasonably expected.

In compliance with the expressed wish of the Association at our last meeting, I have collected data and prepared biographical sketches of as many of our 123 members as I could. Circulars were addressed to all, but some have not responded, possibly because the letters did not reach them, as the address of four is not known. The biographies will follow the address and be arranged in alphabetical order.

The following is a list (June 6th, 1877) of the names of our deceased members :

- Ames, Alfred Elisha, died September 23, 1874, æt. 60.
- Armsby, James H., died December 3, 1875, æt. 66.
- Bibb, George Richard, died June 28, 1874, æt. 32.
- Brown, Benj. Stanton, died December 19, 1875, æt. 73.
- Collins, G. L.,* died August 25, 1877, æt. 56.
- Crist, David Levi, died March 18, 1875, æt. 58.
- Cummins, Robert Hazlett, died April 12, 1873, æt. 56.
- Curtis, Edward M., died May 12, 1874, æt. 34.
- De Bruler, James P., died August 12, 1874, æt. 57.
- Hill, N. B., died February 5, 1875, æt. 58.
- Jackson, John Davies, died December 8, 1875, æt. 41.
- Jones, A. B., died October 15, 1876, æt. 47.
- Kane, Edward, died January 21, 1875, æt. 74.
- Mendenhall, George, died June 4, 1874, æt. 60.
- Moore, E. B., died September 16, 1874, æt. 73.
- O'Donnell, Dominick A., died August 26, 1874, æt. 65.
- Robinson, M. F., died July 7, 1874, æt. 54.

* Dr. Collins, it will be observed, died since this address was delivered.

At our last meeting I was chosen your President, an honor which imposed the duty to address you on this occasion.

The selection of a subject worthy of your attention has caused me solicitude: and in the choice of a theme, I found myself almost involuntarily led to consider some of the problems discussed with my companions when crossing the great American plains. While we traveled for days through an uninhabited country, the mind was almost compelled to a retrospection, and to ponder over the existence of these immense interior plateaus and the fact of their being nearly destitute of population, of timber, and in a great degree of birds and animals. Was it always so? Were these vast regions always so poorly supplied with animal life? I think not. The testimony of the scientists who have examined the country is that ample evidence exists that at some remote period it had a numerous flora and fauna, which no longer exists and which possibly included man. With the aid of the imagination and with the light of recent discoveries, the attempt in fancy to review the great dead past, and by these means to repeople North America with its long-departed inhabitants, was on that occasion a most agreeable pastime.

I am aware that a scientific discussion of the subject would require me to treat of the animals and plants in the order of their appearance, to be deduced from geological evidences. As plants preceded animals, so ani-

Sayer, D. M., died August 3, 1876, æt. 69.

Thomas, William, died April 2, 1875, æt. 70.

Average age of deceased, 58 years.

imals preceded man. But possessing neither the ability nor the time for so systematic a study, I will commence with the Indian of North America, who to most of us is only known from what we glean of him through a casual perusal of history. An opportunity was now afforded us of seeing something of this race on its native soil, with habits but little altered by association with the whites, as, dressed in their wild costume, they congregated about the railroad stations, or were encamped along the streams in view from the train. Naturally enough the inquiry was suggested to us, as it had often been to others, are the Indians a type of a primitive race who, if left to themselves, in time would have developed and become familiar with the arts and appliances which so distinguish, if they do not constitute, civilization? Or must we view the Indian as having once belonged to a civilized race which has from some cause degenerated into the savage state in which we find it?*

An examination of the data for opinions on this subject shows us that the majority of the tribes and nations of the earth were, in the dawn of history, in a condition of savagery or barbarism. This view accords with the more recent discoveries, and renders it very probable that all races, nations, and peoples were in their beginning in a state of savagery, without articulate language or a knowledge of any of the arts, or even the use of fire.†

* This theory is maintained by Archbishop Whately and those who view the subject from a purely theological and traditionary stand-point.

† See the works of Morgan, Lyell, Lubbock, Baldwin, Rau, and others.

The creation of a language to express ideas and the acquisition of a knowledge of how to make implements and use fire, no doubt required many ages. Although the study of archæology is comparatively new, it has already done much to dissipate certain doubts and supply links in the evidence of man's condition in the world in prehistoric times.

You are aware that one of the most embarrassing obstacles to the proper investigation of the age of the world and the antiquity of man has been the traditional scriptural account of the creation of the world in six terrestrial days, together with a chronology of about six thousand years. This dogmatic, though I believe unauthorized, interpretation has greatly hampered the student, for every conscientious man hesitates to adopt or maintain views, though based on facts, which have even the semblance of a conflict with settled religious beliefs. Many able scientists, by giving a liberal interpretation to the Scriptures, understand the periods of time commonly designated "days" to be really eons of indefinite duration.

The Christian Church, which has established so many dogmas, has not decided that the day mentioned in Genesis meant twenty-four hours, nor has it fixed a date when man was created and placed upon the earth.* I might readily cite the names of many learned clergymen, of different denominations, who are greatly interested in the investigation of cosmical laws

* Mgr. Mignon, Bishop of Chalons-sur-Marne, is one of the best informed ethnologists and most enthusiastic cultivators of the sciences of ethnology and archæology in France, and hence it may readily be inferred that such studies do not trench upon orthodox doctrines. (Figuier, p. 2.)

which demand a much higher antiquity for the world than biblical scholars have been assigning to it. In the absence of specific revelation on the subject of the age of the earth, and the time of the first appearance of man on it, such questions are properly within the domain of scientific inquiry, and therefore all discovered facts in any wise bearing upon them should be presented to the public and discussed in a philosophic spirit, free from bias or preconceived notions.

The geologist in studying the rocks that compose the earth's crust recognizes their component parts and the organic forms embedded in them, and by such facts determines their relative position and their ages. The remains of man and his works found in the rocks, or buried in the earth, must be judged by the same rules as those which apply to the remains of plants or animals. Fossils and implements are the medals of great epochs in the earth's history. When once the consent of theologians to go beyond the traditional chronology of creation becomes general, cosmographers will have less difficulty in tracing the evolution of the globe that we inhabit and calculating the period required to prepare it for supporting animal life.*

* It may not be amiss to present a few of the reasons which establish in the minds of competent physicists a belief in the great antiquity of the earth. Sir William Thompson, in the *Philosophical Magazine* for 1863, has calculated the probable age of the crust of the earth at 98,000,000 years, which only comprehends the geological history of the globe. The astronomer Laplace, in his *Nebular Theory of the Cosmogony of the Universe*, as presented in an admirable paper by Prof. S. Newcomb before the Philosophical Society of Washington, starts with the hypothesis that there was probably a time when the sun with its atmosphere occupied all the space of the solar system. That in its revolutions, and by the radiation of its heat into space, it

No science comprehensive in its scope and capable of progress can reasonably hope to escape contests

condensed its atmosphere at the surface from nebulous matter, which aggregated first into bands and then into isolated spheres, thus commencing the formation of new revolving suns and planets. It is supposed the earth and all the other planets were in time thrown off from the sun's surface into space to revolve as independent bodies in defined orbits. There was in this theory a period when, in the language of the Bible, "the earth was without form and void." In the consideration of such a problem we are compelled to estimate measures of time or eons stretching so far back into eternity as to be incomprehensible to man. Calculations as to the time required for the condensation of the sun's original atmosphere and the radiation of its heat into space, have also been made by Sir William Thompson, showing that it must have required millions upon millions of years. One of these estimates is put down at 500,000,000 years. The hypothesis that the earth passed in its process of condensation from a gas to a semi-fluid molten mass, and that it is still liquid toward the center and is gradually cooling, is generally accepted. Professor Haughton, in a lecture on geology, estimates that it required 350,000,000 years for the earth to cool from 2,000° to 200° centigrade; that the time required for cooling from 212° (temperature of boiling water) to 122° Fahrenheit (at which organic life is possible) would require 1,018,000,000 years, and that it would require 1,280,000,000 years to cool from 122° F. to 77° F. (Pre-Glacial Man, by J. S. Moor, p. 7.)

As a further illustration of the subject, I present the chemical theory of the formation of our globe out of the sixty-four elements, supposed by Laplace to have been thrown off from the surface of the sun, in a state of vapor, at a high degree of heat. This abstract is arranged from views of Lockyer, Metscherlich, Daubree, and T. Sterry Hunt, but more particularly from the recent able presentation of the subject before the Washington Philosophical Society, by Dr. Thomas Antisell. It has been estimated that the temperature of the incandescent atmosphere when it left the sun had a heat of at least 22,000° centigrade. A degree of heat such as this was sufficient to vaporize all the elements composing the earth and keep them in a gaseous state. All molecules and substances of every kind were thus held in a condition of dissociation, and no solid could form until the temperature had fallen to or below 2,500°. The time required for the cooling of the primal atmos-

with old and cherished views that have acquired general acceptance. Although the late discoveries in

phere no doubt required many centuries. Gravitation would cause the heavier molecules to sink down to a lower strata of the atmosphere in which they were suspended, and whenever they reached a temperature where repulsion ceased, and chemical affinities could act, combinations would naturally be formed. And, as might be expected, elements in the greatest abundance, and which unite at the highest heat, would first form compounds and be deposited as a sort of crust upon the surface of the glowing and incandescent molten mass below, which began to form the solid surface of the earth.

Neither carbon, sulphur, nor phosphorus, could combine at such high temperature. It is therefore probable that silicon with oxygen, and hydrogen with oxygen, which unite at high temperatures, would be the first combining elements. These substances, too, are so abundant as to form about seventy-five one-hundredths of the crust of the globe. The metals aluminium and potassium would probably form the first combinations among the metalloids. It is not probable that any of the original chemical unions now exist, but that all our rocks, minerals, and earths are the result of metamorphic and erosive action.

The atmosphere during the early age of the earth, it is supposed, was many times heavier, and of a highly acid character, which must have had, under the influence of heat, a formidable dissolving power. Oxygen, which forms about one-fifth of the whole volume of the atmosphere, was, during the cosmical period, in a much larger proportion, as it forms nearly two-thirds of the solid substance of the entire globe. The tendency is constant in the economy of nature to rob the atmosphere of its oxygen and to fix it in new forms, as rocks, minerals, and other solids of the earth. Liquid water could be formed only after the temperature of the atmosphere had fallen below 212° Fahrenheit. The changes that had yet to take place in the lowering of temperature, the purification of the water, and the metamorphosis of the rocks and their disintegration into soils before life was possible, no doubt required many ages.

It has been more my purpose to hint at these great cosmical epochs and changes than to present them in detail. I am persuaded that no attentive student of the form and constitution of our globe will fail to recognize the fact that it has been a thing of slow growth and has undergone many changes. Nor can any one contemplate the plan of the

archæology and the deductions from cosmical laws have met with some opposition, they have nevertheless gained a fuller recognition than could reasonably have been expected.

That there was a time in the history of our planet when it received no radiated light, is probable. If this hypothesis be true, it follows that under such conditions it was impossible for either vegetable or animal life to exist upon it. But after eons of time had prepared at least portions of the earth for the reception of living things, there were localities, in the region of the poles, and even in the zones now called temperate, where no life existed, or could exist, on account of the intense cold. To the varying eccentricity of the earth's orbit were probably due the cycles of extreme heat and cold and those climatic conditions that prevailed at different periods of the past, and which made it possible for animals and plants requiring a tropical temperature to exist in localities where now none but those of an arctic climate are to be found. The fact is patent, that all portions of the earth are not, and never

universe and not be profoundly impelled to admire the plan of the Divine Architect. The vastness of ethereal space with its suns, planets, and myriads of stars all traversing their endless circuits in order and harmony, attest the power and wisdom of the Almighty. The universe, how incomprehensible is the term! It implies bounds without limits, and all the works of the infinite. No telescope can ever explore the vastness of stellar space, or mind conceive of its wonders.

Astronomers tell us that the stars comprising some of the nebulæ are so distant that light traveling with the usual velocity requires 700,000 years to reach the earth, and that the view we get is not their appearance at the present moment, but what they presented 700,000 years ago. Many other and perhaps more convincing evidences showing the formation and antiquity of the globe might be given.

were, at the same time in a climatic condition to support life. The submergence and re-emergence to which continents have been subjected in geological times were doubtless dependent in some way on the previously alluded to varying eccentricities of the earth's orbit, and possibly coincident with the extremes of heat and cold which produced the different glacial epochs.*

The earliest records we have of the human race, locate its genesis in Asia, near the Tropic of Cancer, and nearly on a parallel with the most ancient civilization known to history on the American continent.†

The belief that a very early civilization, possessing a knowledge of the arts and a written language, existed in Arabia, Hindustan, and in China, is becoming a settled conviction among scholars, and the opinion is also held that there were other early nations which had

* Edward Hitchcock, in his illustrations of surface geology, published in the Smithsonian Contributions to Knowledge, says (page 86): "We may then be quite sure of at least three depressions of the North American continent beneath and an equal number of elevations above the ocean, since the fossiliferous rocks began to be formed."

† The ruins of magnificent cities in Central America, brought prominently to the knowledge of the world by the intelligent labors of Mr. Stephens, was a great surprise to everybody, and particularly to those who had fixed opinions of the age of the world and the nations and peoples who had lived upon it, based on biblical chronology. "Here was a spectacle," says Mr. Stephens, speaking of Central America, "of a people skilled in architecture, sculpture, and drawing, and beyond doubt other more perishable arts, possessing the cultivation and refinement attendant upon these, and not derived from the Old World, but developing and growing up here without models or masters having a distinctly separate, independent existence, like plants and fruits to the soil indigenous."

grown old and dropped out of all tradition or historical record before the days of the Pharaohs. Evidences exist to show that North America was probably in a physical condition to support animal life at as early a period as Asia.

But before alluding to the early races of men, and particularly those of North America, let me make a single remark on its geological age, and then trace the earliest evidences of man in America and incidentally in other parts of the world. I need not speak of the primary and secondary geological period, as man did not then exist, nor in the present inquiry does the whole Mesozoic or the early Palæozoic period demand much more of our attention. Among the later Tertiary periods M. Desnoyers discovered in the chalk-pits of St. Prest, which belong to the Tertiary Pliocene period, evidences of man, associated with the remains of the southern elephant, the rhinoceros, leptorhinus, and a hippopotamus. The latter lived, according to Abbé Bourgeois, during the Miocene period, contemporary with the mastodons, kindred to the elephant, now extinct. The Tertiary man of St. Prest is much anterior to the troglodyte remains, and at least strengthens the hypothesis of man's existence prior to the last Glacial epoch.

It is known to you that about the beginning of the Quaternary period the phenomena of the great changes upon the earth caused by glacial action, ceased. Following this came the Diluvian, when mountain-torrents carried with them rocks, bowlders, and pebbles, sometimes rending mountains and washing out the sides of the hills, transporting great quantities of the *débris* into

the rivers and valleys, the finer particles of earthy matters forming our alluvial deposits and agricultural soils. The heavier portions we recognize as the boulder formations and the gravel-beds. At this time, too, the rivers assumed their present direction and commenced carving out their beds. The changes which have gone on since the Quaternary period are frequently referred to as those of the "present period," and the strata formed during its continuance are called "recent deposits." This brief synopsis of geological facts is deemed essential to a ready understanding of the teachings and theories adopted in reference to human palæontology. They are also important landmarks in prehistoric archæology.

William Evans, President of the Geological Society of London, stated in February, 1875, that till within the last three years it was generally believed that the earliest known traces of man were posterior to the Glacial period.* But the portion of a fibula having been found in the Victoria cave, near Settle, England, in a deposit which was embedded in stiff Glacial clay and scratched pebbles overlain by ice, it may now be looked upon as conclusively established that man lived before the last Glacial period.† Professor James Geikie concludes, from general reasoning, that the palæolithic deposits are of a Pre-Glacial and Inter-Glacial age, and do not in any part belong to the Post-Glacial times, and, farther, that it may be said for certain that no palæolithic bed can be shown to belong to a more recent date than the mild era which preceded the last great submergence.‡

**American Journal of Science*, vol. 10.

†*American Journal of Science*, vol. 10.

‡The Abbé Bourgeois, in his investigations on archæology, carries

America is frequently spoken of as the "New World," but geological evidences render it probable that it is among the oldest of the continents. The rocks of Canada are at least as ancient as any exposed in Europe. Too little is known of the geology of Asia to enable me to speak of it. Professor Agassiz said, "Geology finds its oldest landmarks in America."*

man back to the Lower Miocene times. In the records of the Geological Society of India for 1873, Medlicott gives an account of a quartzite implement, precisely of the same class as those found in Southern India, which was discovered in the deposit of the Narmada Valley. The late Dr. Falconer regarded these deposits as Pliocene, while Medlicott places them with the Pleistocene. In India, man co-exists with the *Elephas insignis*, *Bos*, and *Hippopotamus nomadicus*. Lubbock, in *Nature*, March 27th, 1873, communicates the information that mastodon bones having figures of animals etched upon them were found in beds regarded as Miocene Tertiary. From these and other recent discoveries it is rendered probable that the appearance of man goes back to the middle of the Miocene period. (*American Journal of Science*, vol. 5, p. 497.)

* The Laurentian range of mountains in Canada exhibits the oldest metamorphic rocks that have been discovered. As corroborative of the view of the great antiquity of the American continent, Sir Charles Lyell estimates that the Mississippi River has been running in its present bed for 100,000 years. Professor Huxley, in estimating the time required for the Niagara River to have cut its channel from Lewiston to the present falls, indorses the opinion of Lyell that it could not be less than 60,000 years, and may have required much longer. Dr. Bennett Dowler, of New Orleans, discovered four successive tiers of deposits, each with growth of cypress trees, one overlying the other, in the alluvium of the delta of the Mississippi River, which he estimated would have required 57,600 years for their production. Indian bones and pottery were found beneath the roots of some of the cypress trees exhumed in sinking pits for the gas-works at New Orleans, at a depth which he estimated would have required 15,000 years to have filled up and the trees to have grown from the time they were placed there. Fossil remains of air-breathing animals are found in

To comprehend the period of animal life on this planet, we have as a matter of course to deal with many intricate and complex factors, as well as with very remote periods of time. Geology holds the key to and has already revealed some important facts, not only regarding the formation of the globe, but of the character and forms of early life upon it. And palæontology joins hands with geology in furnishing data from which the archæologist finds support and confirmation for the theory that man existed on the earth in Pre-Glacial times, and certainly earlier than the Drift period. The bones of man have so rarely been found embedded in rocks or gravel-drift that this kind of evidence of his very early appearance is less often met with than might have been expected. But just as conclusive of man's existence is the presence of any of his works or implements.*

the coal-bearing rocks in Pennsylvania, Ohio, and other States of the Union. In a letter of recent date, from my friend Dr. Frank Cowan, of Western Pennsylvania, he says that his own collection contains six specimens of air-breathing animals belonging to the Coal series.

* Human remains were found by M. M. Tournal associated with those of extinct animals, as early as 1820, in a cave in the south of France. In 1833, Dr. Schmerling discovered human remains with those of extinct animals, and also some rude stone implements were discovered in a cave near Liège, in Belgium. An account of the fossil man of Denise, comprising the remains of more than one skeleton, found near the town of Le-Puy-en-Velay, in Central France, was published in 1844 by M. Aymard. The authenticity of this specimen was carefully considered by Lyell in his work, *Antiquity of Man* (p. 194), where he also discusses the subject of the fossil human bones found at Natchez, Miss. Portions of a fossilized human skeleton were also found in Florida, by Count F. de Pourtales, in 1848. Dr. Lund, a Swedish naturalist, found human bones in a cave near Minas Geraes, Brazil, associated with evidences of great antiquity. All these point to a period as early as the Post-Pliocene.

The ancient human remains that have been found in America and Europe render it almost certain that although man may not have been contemporary with the first animals in existence, he was at least a co-possessor of the world with many now extinct, such as the cave bear, the mammoth, and many others the remains of which are found associated often with implements and deeply buried in gravel-beds and alluvial deposits of unquestionable antiquity.*

The question of the region of the earth where man first appeared has incidentally been alluded to. The testimony of history upon this point is almost uniformly in favor of the biblical account which locates it in Asia. Some ancient nations occasionally spoke of themselves or were regarded by others as sprung from the soil on which they lived—the Athenians, for example, sometimes denominating themselves “Autochthenes” or “Earth-born,” and the primeval inhabitants of Italy being by the Romans and Etrurians denominated as “Aborigines;” yet it is an undoubted fact that the traditions of all nations point to the great tableland of Central Asia as the cradle of the human race. By some investigators the original seat of the human family is located in Armenia, on the western border of this table-land; by others in Pameer, Bamian,

* See Lyell, Lubbock, Baldwin, and Foster. The latter, in his work entitled “Prehistoric Races of the United States,” p. 79, gives a scale of geological periods and the oldest human remains and implants found up to 1873. The flint-flakes found in the Gravel-beds of Colorado and Wyoming Territories, which belong to the Miocene period, are as early as any in Europe. A human skull was discovered in Calaveras County, California, imbedded in strata belonging to the Pliocene period, and also many articles belonging to the Stone age.

or Bokhara, on the eastern border. Granting Asia to be the home of the first parents of the human family, the problem still remains to account for man upon the North American continent, which modern investigation renders probable is the oldest.

Were I inclined, I have neither the time nor ability to discuss the merits of the hypothesis of separate and distinct centers of either contemporaneous or the subsequent creations of man among the earlier animated beings in different parts of the world. I only allude to the subject so as not to appear indifferent to the solution of the question, and because I deem it unscientific to ignore the theory or to declare that it is impossible for primitive races to have been created in separate localities and at different periods in the world's history. These are questions that have engaged able minds. I will attempt nothing further than to indicate some of the more noted occurrences gathered from history, that might have favored large immigration to this part of the world, and concede, for the present, that it is probable that population was originally distributed from a single center, and that the continent of America was once less difficult to reach by land than it has been in modern times. But man neither immigrates nor migrates without adequate motives. If the only cradle of our race was in Asia, what then were the probable reasons for man's immigration to America and all other parts of the world? To make an exhaustive study of this problem is outside of my present purpose, but I shall give in a note, in the preparation of which I have been much assisted by my friend, M. F. Morris, Esq., some of the more notable events recorded in his-

tory, which it is believed may, to some extent, account for the great migratory movements supposed to have taken place in ancient times, and which may have assisted in populating the North American continent.*

* In connection with the theory that a portion at least of the population of America existing at the time of the discovery by Columbus was derived from the Old World, and especially from Asia, it is worthy of remark that the several periods of the arrival of the Toltecs, Chichemecas, Acolhuans or Tezcucans, and Aztecs, in the valley of Mexico, and of the Incas in Peru, have a singular correspondence with some prominent epochs in Asiatic history. Wars and political convulsions have been the most frequent cause of great emigrations; and while we have no positive proof that the revolutions of Asia have had any influences on the population of America, a curious coincidence of dates invites to an inquiry of the possible connection between the two continents in the Pre-Columbian Period.

China and Tartary were subjected to great intestine commotions, extending from A. D. 420 to A. D. 618, and resulting, according to the Chinese annals, in great emigrations from the empire. The Toltecs, the first known to us, and apparently the most civilized of all the tribes that occupied the valley of Mexico, made their appearance in that region about A. D. 648.

The conquest of Hindustan by Mahmoud of Ghazni, about A. D. 1000, with its accompaniment of religious and political persecution, is known to have caused a great exodus of the Hindu population from their native land and their dispersion over the islands of the Eastern Seas. Not long afterward, about A. D. 1021, appeared near the Lake of Titicaca, in Peru, Manco Capac, the founder of the dynasty and of the Empire of the Incas, whose religious observances and political institutions bear strong resemblances to those of the Solar Race of Hindustan.

Again, the conquest of Northern China by the Mantchu Tartars (A. D. 1115), and the subversion of that ancient empire by the great Mongolian Chiefs, Genghis Khan and Octai Khan, A. D. 1234-'96, may not have been entirely unconnected with the advent of the Chichemecas (A. D. 1170), the Acolhuans (A. D. 1200), and the Aztecs (A. D. 1325), in the valley of Anahuac. That the Mohammedan and Tartar invasions of Eastern Asia were productive of great commotions in that region is very certain; but it is probably impossible

The table-lands in the regions East of the Rocky Mountains have yielded to our explorers, and particularly to that sagacious and indefatigable worker in pal-

at this day to ascertain the extent of the resulting emigration, or its influence, if any, on the Western World.

Recurring to the still earlier period of the Mound-Builders, and the probable date to which we are referred for the time of the construction of their great works, a thousand years before the Christian era, it is remarkable that this was the period of greatest Phœnician activity, the epoch of Solomon and the Queen of Sheba, of Gautama or Buddha in Hindustan, and possibly of Zoroaster in Persia. In the twelfth, thirteenth, and fourteenth century before Christ, the great movement of the nations, beginning with the war of the Lunar Race, for the imperial throne of Hindustan, and marked by the establishment of the Fifth Dynasty in Assyria, the Milesian settlement in Spain and Ireland, the contests of the Pelopeds, Dardanians, and Heracleids in Greece and Asia Minor, and the colonization of the Etrurians in Italy, exerted an influence upon the world that has been traced to the most distant regions of the eastern continent; and it would not be surprising to learn that America was embraced within the same influence.

If the vague intimations of Phœnician and Carthaginian enterprise in the Atlantic Ocean given us by Plato and other writers have any foundation in fact, and if those daring navigators steered westward from the Straits of Hercules in the track subsequently taken by the great Genoese and coasted the shore near which De Soto led his fearless band, they would have reached, as did the latter, the Great Father of Waters, the Mississippi. And if they entered and occupied the country, their forts and habitations would naturally be found scattered along the valley of that river and through the region drained by its tributaries. Now, the traces of the Mound-Builders are found mainly in the Mississippi Valley. They are faint, if indeed they exist at all, on the Atlantic and Pacific slope; and the inference is very strong, that the mysterious race which preceded the nomadic Indian in the center of our continent must have entered the country from the Gulf of Mexico.

In this connection, it may be stated, also, that the auriferous region of Ophir, with which Solomon and his Phœnician allies traded, and

æontology, Professor Marsh, hundreds of specimens of fossil mammals and birds previously unknown. Professor Huxley had an opportunity of examining this rare collection when in America last summer, and on his return to Great Britain took a public occasion to speak in glowing terms of "his good friend" the Yale Professor, and declared that "his achievements had already largely extended the area of knowledge." The Black Hills and the calcareous rocks in that wonderful region between the Colorado and the Rocky Mountains, which was once a shallow sea, contain thousands of fossils as perfectly preserved as though they were encased in a bed of plaster-of-Paris. It was in this region that Mr. Marsh found the two splendid specimens of fossil birds, perfectly preserved, with unmistakable teeth. His fortunate and important discoveries have supplied the missing links of extinct species of the horse. Already his cabinet contains thirty distinct species of the equine tribe. Other explorers are also reaping a rich harvest in this new field; Prof. E. D. Cope's discoveries being scarcely less important to science than those already referred to. This rich deposit of fossils is destined to throw much light upon the stratification as well as the early forms of animal life in North America. As yet it has been but partially explored, and the discoveries actually made have not been fully given to the public. If the flint-flakes observed in the gravel-beds of Colorado and Wyoming prove to be true "finds," and

the voyage to which, together with the return, occupied three years, is conjectured by some to be identical with our California, or some other gold-bearing region of America; and the conjecture is as plausible as any other that has been suggested of the location of that region.

the strata correctly named and assigned to its true geological position, the evidence of man's existence upon this continent will be carried back to the Miocene period. And if the discovery of the human skull in the Pliocene deposit of Calaveras County, California, is to be credited, it is the earliest human remains yet found, older even than the stone implements of Abbeville and Amiens, described by Dr. Falconer, or those furnished by the caves of Belgium and France.*

If the hypothesis be correct that all the primitive races of mankind appeared upon the earth without a knowledge of any of the arts, there can be little doubt that before they were acquired man must have had a severe contest for existence with the elements and the fierce animals which surrounded him. Man's dwelling-places then, doubtless, were in caves or grottoes, and such localities as were easily rendered inaccessible to beasts of prey.† The fact that caves are still

* In the drift deposits of San Joaquin Valley, near Sacramento, were discovered a plummet and a stone hatchet. In Jersey County, Illinois was found the innominate bone of a man associated with flint implant and the bones of extinct animals. Also, human remains and implements were noticed in the drift deposits in the valley of the Sacramento, the Osage, the valley of the Missouri; in the last case they were associated with the bones of a mastodon. Human remains have also been found in other places, all pointing to their great antiquity.

† As confirmative of this view, it is well known that caves have been discovered in almost every country affording conclusive evidences of their having been occupied as habitations by human beings. In Ethiopia, Upper Egypt, the borders of the Red Sea, Mœsia, Mauritania, and the northern part of the Caucasus, and throughout the mountainous regions of Arabia, are numerous caves which have been converted into the dwelling-places of the half-savage Bedouins. Ptolemy, the Grecian geographer, described what he called races of

occupied as dwellings in the mountainous parts of Arabia, Nubia, and Upper Egypt, and the many traces of such habitations in other parts of the world, fortify the belief that in early times they frequently served as man's abode, the place for the celebration of his religious observances, as well as the spot of his burial. Naturally, then, if we remember the condition of primitive man, human remains and implements should be found in these localities as they are, and associated with the bones of extinct animals.

As yet no systematic study has been made of the American caves with a view of ascertaining whether man's early dwelling-place on this continent may not have been similar to what it was in other parts of the world. There is reason to believe that there are such in the United States that will yet furnish valuable data upon this interesting subject. F. W. Putnam, of Massachusetts, and Dr. Joseph Jones, of New Orleans, and a few others, have of late turned their attention to their exploration with encouraging results.* It is probable that a very long period elapsed between the time when the inhabitants of America sheltered themselves in caves and places not constructed by themselves, and the time when they were in some localities, as in Colorado, improved by extending them under cliffs and dividing them into apartments, and tenanted by a now forgotten race, which explorers call "Cliff-Dwellers."

We must recognize the possibility of distinct races

troglodyte people, because they lived in caverns. For evidence of this kind of habitations in the United States, see Professor Hayden's and Lieutenant Wheeler's reports for 1875. (See Annual Report Smithsonian Institution 1874, p. 367.)

dwelling in the same region, at the same time, as well as at subsequent periods, and the change which climate and subsistence are capable in time of producing in the modes of life and intellectual powers must not be lost sight of. Although the cave ruins and those of the mound-builders are not conclusive, they nevertheless point out significantly the former existence upon this continent of two different but now extinct races. Sufficient data are not yet available (though rapidly accumulating) for a profitable presentation of this theory of the question of the former inhabitants of North America.

The character of food has doubtless much to do with physical development as well as with courage and mental characteristics.* Observation has fully estab-

* It is probable that the early inhabitants of North America, particularly those dwelling along the sea-coast and large rivers, derived, for many generations, most of their food from shell-fish. This hypothesis is strengthened by the numerous great shell-heaps found all along the Atlantic coast, and frequently referred to by the early explorers and settlers. Dr. Brickell, in his *Natural History of North Carolina*, published 1737, page 289, says :

“It is very strange to see in all the places where they [the Indians] have been formerly settled, or had their towns near the salt waters, what vast quantities of oyster-shells are to be met with on the banks of the rivers, in such heaps that it is surprising to behold them. One might reasonably imagine, by such great quantities as are there, that they scarce lived upon anything else, or that they must have been settled many hundred years in one place, which is not common amongst them, being a people always shifting from one place to another, as their fancies led them.” Vast shell-heaps in the State of New York were noticed by Father Isaac Jacques (see his “Description of New Netherland,” written in 1642-’43).

Sir Charles Lyell describes the great shell-mounds on St. Simon’s Island, near the mouth of the Altamaha River, Georgia.

Shell-heaps are also found on the Tennessee River, at the town of

lished the fact that people who live wholly or chiefly upon a fish diet, as a rule, advance less rapidly, and are slower to acquire and apply a knowledge of the arts, and also present a noticeably lower grade of intelligence than tribes that live by trapping and by the chase. None rank so high or advance so rapidly in the scale of intelligence as those who derive the bulk of their food supply from pastoral and agricultural modes of life. Purely hunter tribes have but few if any domestic animals, and, strangely enough, the milch-cow is among the last added. Only the agricultural and village Indians of the present day keep cows. The milch-cow, so important to civilized man, was no doubt first protected and kept for dairy purposes by pastoral and nomadic races of the Old World, and is frequently alluded to by the early historians.*

Savannah, Tenn., and at various places along its course. For description of them, see Smithsonian Report 1870, page 414. For an account of the shell-heaps of California, by Paul Schumacher, see Smithsonian Report 1874, page 335. Shell-heaps in Illinois, near New Boston, on the Mississippi, are described in the Smithsonian Report 1874, page 353. Shell-heaps are also found in many other States, as Maine, Massachusetts, Connecticut, New York, New Jersey, Maryland, Virginia, South Carolina, Florida, Alabama, &c.

* Man had advanced toward civilization and passed out of the lower savage state before he commenced to collect and tame what are now recognized as domestic animals. These animals were at first kept as beasts of burden, or to be slaughtered as required for food. It is natural to suppose that certain of them soon attracted attention by the amount of milk they were capable of furnishing, and which could be utilized as food. The Greeks milked goats and sheep as well as cows. History tells us that the milk of the camel, the mare, the ass, and a considerable number of other animals has been used as food. A desire to increase the food supply no doubt led to the making of cheese, which was practiced by pastoral and nomadic races from an early period; but the art of making butter, such as we use, is a compara-

As might be inferred, the Indians who have lived in a temperate climate and on productive soil, and had little if any intercourse with predatory hunting bands, being thus left to their own resources, would perpetuate family peculiarities and at the same time progress most in the peaceful arts. Certain tribes dwelling in the valleys and on the plains bordering on the Rocky Mount-

tively late invention. Herodotus in describing the Scythians alludes to the substance called butter and describes the manner of making it, which leaves the inference that we derive the art from them. Hippocrates mentions it as a medicine, and is the first to use the word "butter." This article was not known to the Greeks until a late period, and was only used by them as medicine, not as food. The Romans only used butter as a medicine. Pliny, however, mentions the fact that the barbarous nations (meaning the Germans) made not only cheese but also butter, which was a most pleasant kind of food, and its use distinguished the rich from the poor. It was not considered an article of food as late as the time of Galen. The ancient Christians in Egypt used butter to burn in their lamps at religious festivals; the same use was permitted on Christmas festivals at Rome, when there was a scarcity of oil. The butter spoken of in early history it is evident did not have the consistence and form in which it is made in our time, but was a thin oily substance, which was not cut or spread, but poured and flowed as thin oil. In the cathedral of Rouen, and several other old churches, there are towers called "butter towers," because butter is used in the lamps that light them. It is probable that the Hebrews used butter as a food, although there is some doubt as to the meaning of the various texts upon which such a supposition is founded, as they imply that the mode of making it was by squeezing from cream or sour milk as in making cheese, rather than by churning to separate the fatty particles from the caseine which alone forms the butter. Corroborative of the fact that butter is but a comparatively recent addition to the food supply, we may remark that even now in Southern Europe it is seldom used on the table. In Italy, Spain, Portugal, and France, it is sold in the apothecary shops, and is but little used as an article of diet. In those warm countries, however, olive-oil takes the place butter occupies in cooking in other parts of the world.

ains, more than any others in the United States, have enjoyed these conditions. And it is just here that we find the greatest anomaly in Indian history, the semi-civilized tribes of the Pueblo, Zuni, Isleta, Taos, Moquis, and other village Indians, who have made the greatest advances in the arts and in agriculture. The Pueblo Indians, however, know nothing of the people who built and occupied the cliff-houses. In some respects the many-storied stone and adobe houses of the modern Pueblo Indians of New Mexico resemble the ruins denominated cliff-buildings, but which I think point to a people that antedates the adobe-building race. Some Pueblo Indians state the cliff-buildings were made by Moctazuma's people emigrating from the north.

The catacombs of Rome were from the beginning of the Christian era noted as dwellings and places for religious worship as well as for sepulchre. Wilson's cave, in Indiana, may be taken as one of the best examples yet discovered of a cave which was probably occupied for religious worship in the United States.*

* Perhaps the most remarkable cave-temple is the one on the island of Elephanta, a small island of British India. Here is a very large cave-temple, elaborately decorated and cut in native rock near Bombay. It has long since been deserted by its priests, and is of unknown antiquity. The entrance is 60 feet wide and 18 feet high, supported by two grand columns. The breadth of the cave is 123 feet, with a depth about three times as great. The sides are excavated into compartments and filled with mythological sculptured figures. On the same island there are also two small cave-temples filled with Hindu statuary.

The catacombs of Egypt, from their size, their splendid decorations, and the fact that they are the last resting-place of her long line of kings, have been justly considered the most remarkable in history. The entire chain of mountains in the vicinity of Thebes are mined and occupied as tombs. Those of Syracuse are larger and better preserved than those of Rome. Naples has her subterranean cave or catacomb

"In this sublime inclosure," says Pidgeon, "there are pictures sculptured on the walls representing the sun in various positions, rising, noonday, and declining. The serpent is also sculptured in the form of a circle, with its tail in its mouth, the viper with its mouth widely open, the tongueless crocodile, the seven stars, the hydra-headed serpent, and huge animal somewhat resembling the elephant." There are many delineations of animals not existing in America at the present day, although similar to those of the polar regions, with other tracings strongly resembling Grecian and Roman figures. Caves used to some extent for burial purposes have been noticed in Kentucky, Tennessee, and Indiana, some of which have furnished complete skeletons in a good state of preservation.*

city of the dead. Malta also boasts of her catacombs, which, although not large, are in good preservation. The so-called catacombs of Paris were mere quarries and not properly entitled to be called catacombs, although of late they are being used as a repository of the human remains taken from the crowded cemeteries of the city.

From remote antiquity caves have been places of retreat by the natives, as the lava-beds of Oregon were to the Modoc Indians. When the French conquered Algeria, in 1845, several hundred Arabs were suffocated in the cave of Dahra, by Colonel Pélissier, who directed a fire to be kindled at the entrance.

Dr. Livingstone in his letters from Africa describes vast caves which served as places of refuge for whole tribes with their flocks and household implements.

Desnoyers says, there are at the present ten villages, including the church, existing in rocks but slightly modified by man. The caves of the Dordogne were inhabited by men and domestic animals during the Middle Ages. (W. B. Dawkins' Cave Hunting, p. 6, 7.)

*Dr. Joseph Jones, in his report on the Exploration of the Aboriginal Remains of Tennessee, which forms one of the recent contributions to knowledge by the Smithsonian, describes many sepulchral caves, one in Warren County, in West Tennessee, first referred to by Haywood,

Journeying along the Pacific Railroad to California, a hundred miles or more to the south of us in Colorado, and in Southern Utah, there are indications of a once large population, with groups of old ruins of considerable towns, which give evidence that their builders enjoyed, centuries ago, a high degree of civilization and intelligence, perhaps higher than is possessed by any existing Indian tribe in the United States. Evidence supporting this view is found abundantly in all the valleys intersected by the Gila River in Arizona. J. R. Bartlett, in his *Personal Narrative of Explorations* describes the immense quantity of broken pottery, rude and painted, raw and baked, which is scattered over almost the whole face of the country, and is occasionally washed out from beneath the surface by the freshets. This fact has been noticed in Vol. 7 of the Report of the Pacific Railroad Survey, and indeed by all explorers.* Surprising as are the ruins of these cities in

one near the confines of Smith and Wilson Counties, and another in White County, Tennessee, on the south side of the Cumberland River; also one in Giles County, below Carthage, on the same river; and still another above Carthage, also on the Cumberland; and refers to many others. In 1815 a human body, in part clad in coarse linen wrappings, somewhat after the order of an Egyptian mummy, was discovered in a cave in the vicinity of the Mammoth Cave in Kentucky. A cave near Lexington, Ky., is said to have contained a number of human bones when the first settlers visited the place. In Warren County, Kentucky, Mr. Charles Wilkins in 1817 found human remains in a niter-cave draped in coarse cloths. This list of burial-caves in our country might be considerably extended if desired.

* W. H. Holmes, in a paper on the Ruins of Southwestern Colorado (Dr. F. V. Hayden's report, 1875), says there is scarcely a square mile in the six thousand examined that would not furnish evidence of occupation by a race totally distinct from the nomadic savages who hold it now, and in every way superior to them.

Colorado and New Mexico, there are still other monuments in this region which surpass them in the interest they excite in the student of archæology; these are the ruins of the peculiar habitations to which I have alluded under the name of the cliff-dwellings. In some instances, and in close proximity to these cliff-houses, are found on high promontories large round towers built of stone, as if to serve for lookouts and defences to the cliff-houses.*

The ruins, most carefully examined, are built of stone, and situated along the Rio la Plata, the McElmo, and Rio Mancos, in the southwestern corner of Colorado. The existence of these peculiar remains has been noticed by Capt. A. R. Johnston, Lieutenant Ives, Colonel Simpson, Sitgreave, Bartlett, Wheeler, Newbury, Lieutenant Birney, Oscar Lowe, Dr. H. C. Yarrow, and others. They were first, however, graphically described by W. H. Jackson and W. H. Holmes, who have figured a number of them in Professor Hayden's Report on the Geological Survey of the Territories for 1875. Some of this class of ruins have also been described by Prof. E. D. Cope (see Lieutenant Wheeler's Annual Report for 1875), and by Abbe Em. Dometech in his *Seven Years' Residence in the Deserts of North America*, vol. 1, p. 201. The description of

* Lieut. Col. W. H. Emory, in his *Military Reconnoissance of New Mexico*, p. 133, makes the following remarks: "Near the headwaters of the Salinas, which runs in a course, it is said, nearly north-east and southwest, is a band of Indians called the Soones (possibly this is another name for the Zuni Indians), who, in manner, habits, and pursuits, are said to resemble the Pimas, except that they live in houses scooped from the solid rocks. Many of them are albinos, which may be in consequence of their cavernous dwellings."

these ruins has awakened unusual interest in the study of the condition and habits of the prehistoric races of North America. The cave-houses or cliff-dwellings are found in or along the deep cañons and located in ledges of the rocks, at almost inaccessible heights varying from a few hundred to a thousand feet above the bed of the river.* Some are in a good state of preservation, but for the most part they are in ruins. All of them, however, show skill as well as great labor and perseverance on the part of those who constructed them.

The cliff-houses partake somewhat of the characteristics of cave habitations, but they are a vast improvement upon them, and show a decided advancement in resources and knowledge. I am inclined to think that these semi-caves and cliff ruins show the earliest divisions of the house into apartments to be found in America. Major Powell, however, considers them of more recent construction than the Pueblo adobe ruins existing in the same region. The pottery and other implements so far found in and about them suggest that they have probably been inhabited by an intrusive race, since their builders ceased to occupy these structures. It is very probable that long antedating the building of these cliff-houses, and even the existence

* These structures are of stone, requiring but a front wall and such partitions as they chose to make. A peculiarity is that nearly all have a circular room or apartment, and seldom with windows. Occasionally round stone towers are found built on high promontories and isolated peaks, resembling the round towers or Cuthite remains so numerous found in Ireland. Towers of a similar character are known to exist in Eastern Europe and Asia, in Peru and other parts of the world, and possibly served as temples to a very early civilization.

of the people who built them or the cities whose ruins in Colorado command our admiration, there lived and perished other races of which we have no knowledge and scarcely any remains, because they possessed but few implements and constructed their dwellings of perishable material.*

This hypothesis is strengthened by a class of remains numerous found throughout the Central and Southern States, which have recently engaged the attention of many able archæologists, and which point unmistakably to a very early occupation of North America. The race which erected these monuments must have been numerous and industrious, possessing a stable form of government and an acquaintance with some of the arts. The monuments they have left are distributed throughout the valley of the Mississippi, and are perhaps as old and will prove as enduring as the Pyramids of Egypt. The people who built the mounds were, in my opinion, distinct from and lived long anterior to the Indian. We only know of them by their peculiar earth-works, and by common consent denominate them "The Mound-Builders." That they combined the pastoral and agricultural with the hunter's life is probable, from the fact that their remains are only found in the midst of the most productive lands. The extent of these works, and the time required for their construction, show that they must have had an organized, compact population. The mounds may be described as of three classes, namely, for sacrifice or worship, for defense, and for burial.

* Mr. Wirt says that there were two races extinct before the Indian came to occupy the country. (Mayer's Mexico, p. 260.)

There is also a class of peculiar ruins, though not so numerous as the former, chiefly found in Wisconsin, called "animal mounds," which have been admirably described by Dr. Lapham, and supposed by him to be totemic.* The mounds are found from the Lakes throughout the Mississippi Valley, with evidences that the center of the densest population was in Ohio, Kentucky, and Tennessee. But they exist in every State from South Carolina to Florida, from Labrador and the Lakes to the Mississippi River, around the Mexican Gulf, and even in Mexico and across into the Pacific States. All these monuments point to the same mysterious source. It is difficult to say whether this strange race has become wholly extinct, or was the progenitor of some of the Indians now living.† The

*Animals of one kind or another have in every age and in every country been selected to typify and symbolize both national and religious sentiments which it was desirable to have popularized to secure unity among a people. Symbols are a kind of natural written language with the unlettered; the practice of using them was much more common in ancient times than since the invention of an alphabet. We all know how effectively the Christian Church has introduced the figures of the lamb, the lion, the dove, the serpent, the pelican, the fish, the ox, and many others. The figures of animals have also been placed upon the flags and ensigns of nations, some adopting real and other mythical animal figures. China and Japan have their fabulous dragons, other examples will readily occur to every one. I recognize in the animal mounds the germ of the same sentiment which develops the use of symbols by civilized nations.

† E. G. Squier, who gave us the first and most systematic work on the mounds and antiquities of the Mississippi Valley, held the view that the Mound-Builders were a distinct race from the Indians. When he wrote his second work, entitled "Aboriginal Monuments of New York," he thought he had sufficient evidence to show that the present race of Indians had erected the mounds in that section. Since then,

probabilities are in favor of the former supposition, for the habits of the hunter Indians ever since the discovery of America are entirely opposed to any assumption that would attribute to them the labor necessary for the construction of these works. There certainly has been no building of mounds and but little intrusive occupation of them since Europeans first came to America. But the probabilities amount almost to certainty that they have not been generally occupied within the last thousand years. There are found in many parts of our country the remains of large and well-designed fortifications, as well as of walled cities. A fine example of the latter was recently discovered in the valley of the Rio Chama, near Abiquiu, N. Mex., by Assistant Surgeon H. C. Yarrow, U. S. A., which is described and figured in Lieut. G. M. Wheeler's Report for 1875, p. 145.*

however, according to Mr. Baldwin, jr., in his *Ancient America* (p. 32), Mr. Squier has reaffirmed his first opinion on the subject of the Mound-Builders, and now holds them to be a distinct race.

* It will be remembered that Dr. Hildreth counted over eight hundred rings, each representing one year's growth, upon the trunk of a tree cut from the mound at Marietta, Ohio. (Lyell's *Antiquity of Man*, p. 41.) Calculations of this kind have been made at other mounds, and by different observers, all corroborative of the general conclusion that they were of great antiquity. As indicative of the age of the mounds and earth-works throughout Ohio and Kentucky, it will be remembered that when first discovered they were covered by thick forests of large trees. General Harrison, in an address before the Historical Society of Ohio, dwelt upon the fact that lands abandoned are not, until after many successive growths of scrubby timber, taken possession of by a prevailing class that dominate all others and grow to be large trees, such as were found throughout Ohio and Kentucky, covering these works as thickly as the land elsewhere. Consequently, these forests would have required many hundreds of years for the commencement of such forest-growths after the lands were abandoned by the Mound-Builders.

These earth-works and the archæological antiquities obtained from them have for more than a century been attracting the occasional notice of our historians and scientists. Large collections of relics from them have been made by the Smithsonian Institution, by universities, and by individuals. The Smithsonian from the time of its organization has taken special pains to form a cabinet of American antiquities and to obtain all possible information relating to the aboriginal races of North America. The first Contribution to Knowledge, published under Smithson's munificent bequest, which has been so judiciously administered by Prof. Joseph Henry, was prepared by Squier and Davis, and entitled "Ancient Monuments of the Mississippi Valley."*

* The Smithsonian Institution in 1871 published a second quarto volume by Mr. Squier, entitled "The Aboriginal Monuments of the State of New York." It also issued a volume, by Col. Charles Whittlesy, entitled "Ancient Works in Ohio;" also a volume by the same author entitled "Ancient Mining in Lake Superior." The seventh volume of Contributions to Knowledge by the Smithsonian Institution contains Dr. Lapham's admirable treatise on the Antiquities of Wisconsin. This work is devoted to a delineation of what are denominated "animal mounds," which are supposed to have been chiefly totemic or symbols of allied families and tribes of Indians. In a few instances only have human remains, utensils, and implements been found in them. These earth-works are so constructed as to very closely resemble particular animals, as the bear, the turtle, eagle, and many others, but of gigantic size. In 1855 there was published in the Smithsonian Contributions to Knowledge a work entitled "Archæology of the United States," prepared by Samuel F. Haven. In 1876 a carefully-written volume appeared in the Contributions to Knowledge, prepared by Dr. Joseph Jones, entitled "Explorations of the Aboriginal Remains of Tennessee," which region of our country is particularly rich in caves, tumuli, and stone mounds containing archæological remains of a prehistoric race. The same year a volume entitled the "Archæological Collection of the United States National Museum"

The Smithsonian Institution contains a wonderfully rich collection of archæological specimens obtained from the mounds, including weapons, implements, and ornaments in stone, pottery, and to some small extent of wood and copper, and many articles the use of which is unknown. The specimens which illustrate ancient American archæology have been derived from all parts of the continent and contributed by a host of collectors. Major Powell, Professor Hayden, Lieutenant Wheeler, Mr. Dall, and many others, have added largely to the collection which illustrates the habits of the North American Indians. The collection admirably exhibits the degree of art possessed by prehistoric as well as existing tribes.*

was prepared by Charles Rau. This work must prove to be of great value to those interested in the antiquities of America. In 1866 James G. Swan prepared for the Contributions to Knowledge a volume on the Indians of Cape Flattery, Washington Territory, bringing to light many hitherto unknown facts in relation to the Indians in the northwestern section of the United States. I will mention only one other of the many valuable Contributions to Knowledge on the subject of the antiquities of North America, issued by the Smithsonian Institution, a work prepared by L. H. Morgan, on "Systems of Consanguinity and Affinity." Those interested in this study will also find in the miscellaneous publications of the Institution, and particularly in the annual reports, two or three articles each year relating to the antiquities of America. The bibliography of works treating upon this subject is extensive, and is yearly being added to by careful observers and profound thinkers. A series of quarto volumes are now being published by Prof. J. W. Powell, entitled "Contributions to North American Ethnology," the first volume of which has appeared.

* I do but simple justice to state that this collection is open to the public, and every facility afforded investigators to examine and compare specimens and to consult the valuable libraries of the institution. All articles are named, and the locality whence obtained, as far as practicable, given. This is also true of the collection in the Army Medical Museum.

It was my desire to discuss more in detail the evidences of the great antiquity of the mounds, and to bring together the discoveries and facts warranting this deduction from the implements found in the tumuli, but time does not permit. I will, however, add that the implements and skeletons of recognized Mound-Builders that have thus far been collected are perhaps, considering the tens of thousands of mounds that exist, fewer than might be supposed. Fragments of implements and utensils of intrusive occupiers, as well as their skeletons, often found in the same mound, complicate the question of race as well as that of the period of first deposit.

Dr. G. A. Otis, U. S. A., has made the osteological structure of the prehistoric and Indian races of America a special study. His admirable collection of crania and skeletons from the early burial-places of America is a valuable addition to the Army Medical Museum in Washington, and is the finest, if we except that of the later Professor Morton, of Philadelphia, so rich in foreign crania, of any in the United States. It contains six complete skeletons and one hundred and sixty-four crania, and hundreds of incomplete skeletons of Mound-Builders. From an examination of these, I am inclined to believe they do not represent a race of as large stature as the average Indian of the present day. The following points may be presented as pretty well ascertained anatomical characteristics strongly marked in the Mound-Builders, and in most of the lower races. The foramen magnum is farther back toward the occiput than it is in the white man, and examples of the persistence of the frontal suture in adult life are

much more infrequent than in the European races, or in the white stock of mixed blood in this country. The ossa triquetra or Wormian bones are more frequently met with. The cranial capacity seems less, the supraorbital ridges are more strongly defined, and the facial angle is small and ape-like. The tibia is almost always bowed forward and notably flattened and sharpened—a condition uniformly present, which has been called platycnemism. The pelvis is less dished or curved, and the sacral and coccygeal bones are more nearly vertical. The sigmoid fossa of the humerus is nearly always perforated, and the sesamoid bones are more numerous. Artificial deformities of the skull, generally with asymmetrical portions or flattening, is common in crania taken from tumuli in Florida, Louisiana, and Mississippi.*

It has been stated by Morton and others that the common wants of human beings in no wise related lead them under similar circumstances to adopt very much the same habits of life and means for obtaining food and securing shelter. If this hypothesis be correct, it is less surprising that the savage races living

*Those interested in the subject would do well to consult Dr. Hermann Welcker's "Researches on the Growth and Structure of the Human Crania," and a paper announced before the Philosophical Society of Washington on the persistence of the frontal suture observed in the crania of adult Mound-Builders, also chapter VIII. on the Crania of the Mound-Builders, in J. W. Foster's "Prehistoric Races of the United States" and "A Study of the Skulls and Long Bones found in Mounds" with a table of measurements, by R. J. Farkuharson, M. D., in the Annual Report of the Smithsonian Institution for 1874, p. 361; also the opinion of Prof. Jeffreys Wyman, in the Fourth Annual Report of the Peabody Institute for 1871, Peschel's Races of Men and other works.

at the extremes of North and South America, under very similar climatic conditions, have nearly the same habits, and are all in a deplorably low state of savage life. The fact is familiar to you that the tribes from Behring's Strait along the Frozen Sea, Alaska, and British America, as well as those of Patagonia, within the frozen zone of South America, are all living in a state of savagery, none of them having advanced in the arts beyond what is denominated the rough stone age. On the American continent between these extremes and within the tropics on either side of the equator, civilization founded empires and grew to power, building cities which rivaled in grandeur the finest contemporary architecture of Europe. I need hardly say that I allude to the civilization and architecture of Central America, Yucatan, Mexico, and Peru. Whether the people who erected the cities of Mexico, Uxmal, Palenque, and Quito were the ancestors or descendants of the Mound-Builders, or quite a distinct people, has not, and perhaps never may be, determined. It is very probable that they were in some way related. Each view has able advocates, though I shall not, on this occasion, attempt to present their arguments.

It is known to you that the people of Central America, Mexico, and Peru developed an elaborate architecture and a system of government and religion peculiar to themselves, differing from those of any other race. They also produced a literature of their own ; most of the latter has, unfortunately, been lost.

The Indians of the present period, if not the true aborigines of America, were the pre-Columbian oc-

cupiers of the land. The testimony of the early voyagers and explorers is definite and uniform as to their general characteristics, their peculiar mode of life, their government and their arts. Their grade of advancement was manifest in their social and domestic life, in the construction of their wigwams, the location of villages, the variety of their food, their domestic utensils, their dress,* in the care with which they

* The origin and history of dress or raiment is a subject of much interest, in a study of the progress of our race. Clothing seems so much a matter of course, and which fashion, rank, and usage now control in all civilized countries, as scarcely ever to excite an inquiry as to whether there was a period in the history of man when he did not wear it. If we accept the theory that the human race has emerged from a state of savagery, this condition certainly existed, and with it a moral sense so feeble as not to recognize shame, and unable to control any desire on ethical grounds. It is evident that the purposes of dress among such a people would be different from that which governs civilized society at the present time. From a study of the habits and usages of the uncivilized races, it is probable that dress originated more in a necessity to protect exposed parts from injury and annoyance, than from any mental or moral conception of its propriety. It is undoubtedly true that climate as well as the productions of a region and the methods adopted by races for procuring food, may to some extent determine whether the whole body or a part only be covered. For instance, the Esquimaux, from the rigor of the climate, covers the whole body as a defense against the extreme cold; while races living within the tropics, where clothing is not required for this purpose, are found to dwell in a state of almost complete nudity. The hunter and trapper, living by the chase, would naturally need and wear moccasins, the breech-clout, and perhaps leggings, while those living by fishing might be rather inconvenienced by them. The North American Indians, and particularly those living in the southern parts of the United States at the time this continent was first visited by Europeans, were found to live in nearly a nude state, or to wear little more than an apron. Farther north, tribes depending on game for subsistence wore in cold weather not only moccasins and

cultivated the soil, and in the exercise of forethought in laying up provisions in summer for consumption

leggings, but an additional large dressed skin or skins which they suspended from the shoulder and wrapped around the body. This also served as a couch at night. Among primitive races, where the great struggle of life is to provide food and to defend themselves against the attacks of rapacious animals, it is natural that clothing would receive but little consideration except for protection. If it be true that civilization multiplies our wants, religion supplies motives for human conduct which elevates the race; the two add a new motive for dress by educating a sense of shame, which places the reason for clothing the body largely under the control of the mind. An inquiry into the dress of uncivilized races shows that the parts first covered by them are undoubtedly those requiring protection. A taste for ornamenting the body by painting, tattooing, anointing, and by decorations, such as wearing beads and strings of trophies of various kinds around the neck and limbs, is practiced by all primitive races. The apron or kilt is often used more as an adornment of the body than from any other motive. Much care is taken by most savage tribes to decorate the head, and to arrange the hair in a fanciful manner. Frequently the head and neck are dressed with elaborate care, while the rest of the body is left entirely uncovered. The apron is generally worn in front, but sometimes behind; some wear two, one in front and the other behind, while others wear two but suspend them from the sides, and frequently they fail to meet in front and in the rear. It is true, however, that the use of an apron or breech-clout of some kind is among the earliest articles of dress worn; perhaps next in order is the sandal, or moccasin, and particularly by males among tribes that live by the chase. The youth of both sexes of most uncivilized races in tropical regions are left entirely without clothing. About the age of puberty, and more from a desire of decorating the body than from any sense of propriety or shame, the apron is put on, but its use is not considered a matter of consequence or its omission an impropriety. The two sexes dress nearly in the same manner. It is generally known that among the Chinese and Japanese, and indeed other eastern peoples, the same dress, nearly, serves for the two sexes. A wonderful advance has taken place in the ethics of dress since the advent of Christianity, but it cannot be denied that much of the love of dress is due to the mental delight and satisfaction it affords

during the winter. Their intelligence was further indicated by the implements used in the chase, in war,

rather than to any overpowering sense of modesty or necessity. Doubtless there are many factors which assist in determining a preference for the material used and the form and number of garments to cover the body in different countries. Christian civilization has required distinctiveness in the dress of religious and privileged classes, and particularly of the sexes. The development of the idea of the desirableness as well as the manner of clothing the lower limbs of men separately in pantaloons that reach the feet has been a matter of slow growth and accomplished within the memory of persons now living. Improvement in the convenience of the dress of females has not progressed as with the opposite sex. The earliest examples of the body so clad as to permit the free use of the lower extremities as well as the upper is to be found in the sculptured figures dressed in armor of Egyptian and Phœnician origin. The line of progress and invention in dress throughout the Greek and Roman civilizations is pretty well known. Changes in national peculiarities of costume, even in modern times, are very slow, so that the taste of one age is frequently shocked by the lingering characteristics of a preceding one. This however, is as true of popular sentiments and behavior of a people, or of an age, as of the material and form of their dress. And, it should be borne in mind, retrogression in either is as natural as progress.

I will give one instance showing the tendency to retrogression in dress, although there are many that could be cited, within historical times. The following fact is recorded in the notes of the Rev. Dr. Joseph Doddridge, published in Samuel Kercheval's *History of the Valley of Virginia*, p. 339: "In the latter years of the Indian war our young men became more enamored of the Indian dress throughout with the exception of the match coat. The drawers were laid aside and the leggings made longer, so as to reach the upper part of the thigh. The Indian breech-clout was adopted. This was a piece of linen or cloth nearly a yard long and eight or nine inches broad. This passed under the belt before and behind, leaving the ends for flaps, hanging before and behind over the belt. These belts were sometimes ornamented with some coarse kind of embroidery-work. To the same belts which secured the breech-clout, strings which supported the long leggings were attached. When this belt, as was often the case, passed over the hunting-shirt, the upper part of the thighs

and in their manner of constructing movable wigwams or comparatively permanent villages of family lodges, communal houses, and in their modes of life as contrasted with the purely nomadic habits of hunting and fishing tribes.*

and part of the hips were naked. The young warrior, instead of being abashed by this nudity, was proud of his Indian-like dress. In some few instances I have seen them go into places of public worship in this dress."

* It is a fact deserving of remembrance that the world is indebted to America for two of its most important articles of food, maize or Indian corn, and the potato, now commonly called the Irish potato. Corn, beans, peas, melons and many roots were cultivated by the Indians in North America when first visited by Europeans. That now staple article of commerce and luxury of the world, tobacco, was also planted and extensively used by the Indians of North America.

Du Pratz, an accurate observer and a resident of the Lower Mississippi for fifteen years, in his history of Louisiana, gives an account of the great quantities of corn grown by the Natchez Indians. He was living among them in 1720, and at one time received from them "twenty barrels of maize of one hundred and fifty pounds each." He also describes the fruitfulness of the soil, the fine crops of potatoes, (possibly the sweet potato), beans, melons, and other vegetables and grains cultivated by the Indians. Agriculture was also carried on in Virginia and North Carolina to a very considerable extent.

Smith, in his History of Virginia, vol. 1, p. 131, says: "Their houses are in the midst of their fields or gardens, which are small plots or ground, some twenty acres, some forty, some one hundred, some two hundred, some more and some less. In some places from two to fifty of their houses are together, or but little separated by groups of trees." On page 191 in the same volume he tells us that in September, 1608, he received from the Nansamond Indians at one time four hundred baskets full of corn. And when the infant colony was suffering from want of provisions, the Chickahominy Indians furnished him with one hundred bushels. Great heaps of corn, he says, were to be seen in the villages of the Kekoughtan and other tribes. The early colonists had from time to time received corn and other provisions from Powhatan and his subjects along the James River.

The most successful attempt at confederation and unity of government among Indian tribes with which we are acquainted, originated with the Iroquois or Six Nations, living in the Northern and Middle States of our Union. The Algonkin, a once numerous race or league which occupied the Upper Mississippi Valley and the Lake region, parts of New England, and extended as far south as Pamlico Sound, though still numerous and warlike at the time the European settlement commenced in Massachusetts, had already begun to decline in power. Other tribes of considerable note in the early history of our country are deserving of mention. It is well known to you that the Indians residing in the southern parts of the Union had also formed tribal compacts and manifested some pretensions to nationality.* Of these the chief was

The Iroquois or Six Nations were also successful agriculturists, and the most powerful Indian confederation in America. At the beginning of the American Revolution they were more advanced in the warlike arts than other tribes. They owed perhaps much of their progress to the French missionaries, and to the early introduction of fire-arms and edge-tools received from the traders who had been for a century and more among them. They became quite provident, too, in laying up stores of grain and provisions for winter's use. This they were enabled to do by the cultivation of considerable tracts of land in corn, beans, and vegetables, and had orchards of apple trees. The peach plum, and apple were also cultivated in Virginia and North Carolina. The Pueblo Indians of Taos, in New Mexico, disposed of 6,000 bushels of fine wheat raised by themselves to the United States quartermaster in 1875.

*The confederacy of the Iroquois consisted at first of five independent tribes, then of six, and finally of seven. The Powhatan confederacy was formed of at least three independent tribes; the Creek confederacy consisted of six tribes; the Ottawa of three. The Dacotah league had seven fires and the Moqui confederacy seven pueblas.

Powhatan, who gave his own name to a confederation, which included the tribes of the Monacans, and Manahocks, and perhaps others, who lived to the west and northeast of the mouth of the James River, and among the foot-hills of the Blue Ridge and Alleghany Mountains. This Indian potentate, at the time of the first settlement of Jamestown in 1607, was generally recognized by the Indians as a sort of king, and maintained a numerous retinue of hunters and warriors. This confederation had made some progress toward civilization, if judged from the point of view of having fixed habitations, peaceful pursuits, and the possession of some of the useful arts, the most important of which was agriculture.

The intelligence to provide stores of grain, fish, and other articles of subsistence, was the first step to the recognition of property, and one essential to civilization. They had passed out of the condition of savagery.

Although some tribes north of the Potomac had advanced so far as to erect dwellings of a more or less permanent character, and even to cultivate certain crops, yet, leaving out the Pueblo Indians of New Mexico, none either north or south seem to have attained that degree of civilization which erected temples and recognized not only a priest but a priesthood, and practiced a fixed system of religious worship, except the Natchez tribe, with its affiliated branches of Indians living on the Lower Mississippi. As religion is one of the chief elements in unifying a people, it is

The New England Pokanoket confederacy, under Massasoit, over several tribes and a large section of country. Doubtless there were other confederacies of which I have no data.

probable that among the Mound-Builders and their successors, the Natchez Indians, there may have existed a sort of primacy or unity of religion throughout the Mississippi Valley. This possibly may have been serpent and sun worship, or some form of religion in which these were figures that symbolized a meaning of which we have no knowledge.* It is an interesting question in ethnology to account for the fact and to ascertain whence came the races of semi-civilized village and communal Indians now occupying the region of our country included within the territories of New Mexico, Arizona, and the southern parts of Colorado and Utah. It is believed by many, that within this boundary once existed an old civilization, older even than the Seven Cities of Cibola. The population in this region was once very considerable, particularly along the water-courses of the Gila, the Casas Grandes, the Del Norte, the Colorado, the head branches of the Arkansas, the Pecos, the San Juan, the Chamas, the Chaco, the Canadian, the Puerco of the West, and other streams throughout the rich adjacent mountain valleys. There are within this region a number of distinct tribes, speaking different languages, yet possessing so many

* It is true that in a few caves and in some of the temples and sacrificial mounds crude picture drawings and symbols of the sun and other planetary bodies, supposed to be associated with sun-worship, have been found. This evidence seems to favor the theory that the Mound-Builders or their immediate successors were sun-worshippers. The Indians of historic times were all more or less superstitious and practiced wizard incantations, which have been erroneously called religious observances. I am aware it is claimed that a few tribes in New Mexico and Colorado practice a sort of sun-worship. If so, these facts furnish a foundation for a claim to relationship with the ancient Mound-Builders.

traits in common that they are all denominated Pueblos, chiefly because they build large stone or adobe communal houses of from one to six stories high. The best known of the tribes are the Pueblo, the Zuni, the Moqui, the Pima, the Isleta, and the San Ildefonso, all peaceful cultivators of the soil. These Indians are known to have had about the same habits and modes of life since the time of the expedition of Vasques Coronado in 1540-'42, when in search of gold he plundered their cities. The work giving an account of his expedition was first published in English in 1600.*

By means of irrigation these Indians of New Mexico were enabled to cultivate the rich valleys and raise good crops of wheat, corn, cotton, flax, and a variety of vegetables. They had acquired a proficiency in many arts, such as the making of pottery, spinning and weaving, before they were visited by the expedition referred to. These people have had the Gospel preached to them for two hundred years, and yet many of them are said to adhere to a sort of sun-worship, and have houses in which they maintain a perpetual sacrificial fire. If it be a fact that they are sun-worshipers, it would naturally suggest an Asiatic origin or intercourse. Explorers have found in this region a few mounds resembling those of the Missis-

*Lieut. Col. W. H. Emory, in *Notes of a Military Reconnaissance from Fort Leavenworth to San Diego, Cal.*, page 133, gives the following as the existing names of the seven towns most nearly conforming to the locality of the ancient and marvelously rich seven cities: Cibolleta, Moquino, Pojuto, Covero, Acoma, Laguna, Poblacion, the last in ruins.

issippi Valley. It is possible that the Mound-Builders migrated and disappeared in this direction.*

The Iroquois of New York State were village Indians, building long wooden houses, and lived in a sort of communal way, though they respected the family by giving to each a separate fire. They also cultivated the soil, growing corn, root vegetables, and fruits, among which is said to have been the apple.

The Virginia Indians also lived in villages, around some of which were erected stockade defenses like those of a fort. They were, as already stated, provident in their habits, laying up stores of dried meats, fish, corn, beans, and fruits for future use.

Village life and agricultural pursuits seem to be the path that leads to civilization, and tribes that adopted them have also led in the arts of making pottery, weaving, etc. A number might be named that have advanced toward civilization within historic times.

The Cherokees, once a powerful southern Indian tribe, have now nearly the complete civil control of the Indian Territory, west of the Mississippi, to which

* Capt. A. R. Johnston, in his *Journal of an Expedition from Santa Fé to Mexico* in 1846, p. 598, after describing the ruins of a considerable city near the Gila River, notices a mound of which he gives the following detailed description: "About two hundred yards from this building was a mound, in a circle a hundred yards around. The center was hollow, 25 yards in diameter, with two vamps or slopes going down to its bottom. It was probably a well now partly filled up. A similar one was seen near Mount Dallas. A few yards farther in the same direction northward was a terrace 100 by 70, about 5 feet high. Upon this was a pyramid about 8 feet high, and 25 yards square at the top. From this, sitting on my horse, I could overlook the vast plain lying N. E. and W. on the left bank of the Gila. The ground in view was about 15 miles, all of which, it would seem, had been irrigated by the waters of the Gila."

they were removed from Georgia in 1838. Many of them are industrious and thrifty agriculturists, and some are good mechanics. They have invented an alphabet and have a written language and laws. The Creeks, also a southern tribe, now living in the Indian Territory, are advancing in civilization and peaceful pursuits. The Choctaws, and also the Chickasaws, were once powerful tribes in the State of Mississippi, but are now in the Indian Territory, and are advancing in civilization and a knowledge of the peaceful arts, and have in existence nearly one hundred schools. The Seminoles, another southern tribe, were removed to the Indian Territory, and are adopting the habits of civilized people.

It is a notable fact that Indians showing the greatest capacity for acquiring a knowledge of the arts and methods known to civilization, and at the same time increasing in population, are mostly of a southern origin. But while it is true that, in the few instances given, they have shown a capacity for advancement in the scale of civilization, yet it must be confessed, and with sadness, that as a people the Indian is believed to be disappearing, in consequence of not being able to conform readily to peaceful and civilized habits. On this point, however, Maj. J. C. Powell takes issue with the generally accepted view of their gradual decrease, and states that the Indians of North America, notwithstanding they are confined to very much narrower limits, are as numerous as at any period in the past. As a general fact, the Indians of the United States are but little more advanced than they were when first seen by the Europeans. It is true that,

through an association with the whites, the possession of fire-arms and edge-tools, and the re-introduction of the horse, many tribes of Indians are now able to accomplish feats in war and in hunting which, before Europeans came among them, were impossible; but the majority of the fishing and a few of the hunter tribes are still in the stone age. The tribes associated with the whites, and those referred to in the Indian Territory, have acquired some knowledge of the arts, and to a slight extent work in metals. The Pueblos, as already stated, were village Indians in possession of some of the arts when America was discovered.

In studying the past condition of the Indians we should keep in view the state of the domestic arts and comforts common in Europe at the time of the discovery of America. The best Indian houses, cabins, or wigwams, at the time European settlements commenced in America, were, and still are, without floors, chimneys, or windows. We naturally think these very crude dwellings, as they undoubtedly are; nevertheless, it is also true that chimneys and windows were then nowhere in common use, and are of comparatively late introduction into the dwellings of the middle and working classes in Europe.*

* Our ancestors four centuries ago had different views of domestic and personal comfort from those that prevail at the present time. The chimney for carrying off the smoke of a house is of modern invention. It was not introduced into England before the twelfth, and into Italy in the thirteenth century. Even in the seventeenth century throughout England the houses of the well-to-do yeomen were without chimneys. This was true of houses generally throughout Europe. The introduction of glass into windows of dwelling-houses is a still more modern invention and luxury.

The state of the arts and commerce among the different nations of Indians has been well described by Mr. C. Rau, in a paper on "Ancient Aboriginal Trade in North America," published in the Smithsonian Report for 1872. He shows that their commerce must have been considerable by way of exchange among tribes living widely apart.

The archæological remains of North America point unmistakably to the existence of one or more races upon this continent anterior to the appearance of the Indians. The evidence of this rests upon remains and implements found, and the material of which they are made. Much may be inferred from the locality as well as position from which they are recovered, as from caves, mounds, gravel-banks, mines, and earth deposits, which point to their remoteness, and bear evidence of a sequence in time of occupation by an antecedent and subsequent people of the same locality, as well as their degree of development, to be inferred from the implements themselves.

Shells from the Pacific obsidians and flints from Mexico have frequently been found in the mounds of the Mississippi Valley. Their skill in the arts is shown by their implements of war and of the chase, fishing, agriculture, domestic utensils, and by their more elaborate carving in stone and on shells, and their work in pottery of various forms, burnt and glazed. Some of the figures modeled in clay or cut in stone are fanciful enough, but many resemble animals they admired or dreaded, and, although rude, are readily recognized. In a few localities polished stone implements have been found, and some attempts

seem to have been made to hammer the native copper into ornaments and weapons. A few tribes manufactured stone pipes of different colors, which they carved elaborately and ornamented with peculiar figures, perhaps totemic in their character.

As intimated heretofore, the Indians that have given the greatest evidence of improvement all cultivated the soil and had comparatively fixed habitations. Tribes as they grew powerful elected their chiefs with more care, and respected those in authority, decorated their bodies with more art, and their ceremonies became more comprehensive and impressive. Their villages gradually acquired greater permanence and their dwellings were constructed with a view to more comfort, and greater solicitude was manifested to provide variety and abundance of subsistence. Even this meager development was a positive advance along the road that leads to civilization, and naturally demanded a division of labor.

As it is quite impossible to follow out in detail the habits and usages peculiar to the different tribes of North American Indians, and particularly those which mark the line of progress toward civilization, I will therefore confine my remaining remarks to some points in the practice of medicine among them.* I wish,

* The names applied by Indians themselves to their physicians are curious, and I think of sufficient interest to present those I have collected in a list. The following have been used by different tribes, and no doubt many other appellations might be found :

To designate the physician, who is often also a prophet :

Jossakeed,	.	.	.	.	.	.	Schoolcraft.
Wabanos,	.	.	.	.	.	.	"
Medas,	.	.	.	.	.	.	"

however, to premise that my investigation of the subject is by no means exhaustive. But, contrary to

Muskeke Winenes,	Schoolcraft,
Waukaon man or Wapiga,	"
Mada-Winunee,	"
Medawin,	"
Wicaxta Wakan, Supernatural or God man,	"
Taku Wakan, Mysterious, Supernatural God-dream,	"
Zuya Wakan, War Prophet,	"
Wapeya Wakan, Renovator or Restorer,	"
Wawkawn, Medicine-man,	E. D. Neill.
Keelalley, Physician,	Alex. Ross.
Tla-quill-augh, Physician, or man of super-natural gifts,	"
Shaman,	H. H. Bancroft.
Ma-ke,	F. E. Grossmann.
Autmoins,	Charlevoix.
Pow-Wow,	De Forest.
Jaotianas,	C. C. Jones.
Machi,	Rev. J. G. Wood.
Bilbos,	"
Piaye, Piaï, or Paye,	Oscar Peschel.

The names applied by Europeans to Indian physicians are numerous, and sometimes applied in derision, as "medicine-man," "doctor," "mystery-man," "conjurer," "juggler," "priest," "prophet," etc.

Accidentally meeting Dr. Thomas Foster, late Indian historiographer of the United States, I exhibited to him the foregoing list of appellations for Indian physicians collected from different authors, which he thought in some respects defective, and the next day kindly sent me the following list of Algonkin and Dacotah names, which I deem in this connection deserving of presentation.

"DOCTOR" AND "MEDICINE" IN CHIPPEWAY ALGONKIN.

Māshkōsē'ū, grass or herbs.

Māshkē'k, marsh.

Māshkē'ke, medicine (roots).

Māshkē'kē-wābō', liquid medicine to drink.

Māshkē'kē-wēnē'nē, medicine-man.

expectation, the study given the subject from an historical point of view has led me to the conviction that the appearance of the physician among primitive, savage, and barbarous races antedates the priest and the lawgiver. The physician among all tribes is a person of dignity and of the highest consideration, and is present at all important councils, and after death is buried with imposing ceremonies.* He usually dresses with

Mā'shkōdā', a prairie.

Nānā'ndāwē' ēwā'-wēnē'nē, who gives medicine, the man.

Nānā'ndāwē'ōwē'n, medicine, remedy, etc.

Tchā'sāke'd, juggler. (Jossākeed by Schoolcraft.)

Tchēs-kā'ewē'n, jugglery.

Tchē'sākā'n, juggler's lodge.

Kōsā'bāndāmōwē'n, jugglers in regard to sickness.

Medā', an Indian Algonkin who is a member of the secret semi-religious order of the "grand medicine." This name has its root in words which signify to *eat* and *set aside*; in other words, the grand medicine is a *feast apart* or *secret*, or it may mean the long preliminary *fast* necessary to admission, in which all eating is put aside or refrained from.

"DOCTOR" AND "MEDICINE" IN SIOUX-DACOTAH.

Pāzhe', grass, herbs, hay.

Pā'zhe-hū'tā, grass-roots, herbs, medicines of all kinds.

Pā'zhe-hū'tā Wetchā'stā, a medicine man, a physician.

Wākā'n, adj., spiritual, sacred, consecrated, wonderful, incomprehensible, preternatural.

Wākā'n-āтчō'n, to do tricks of jugglery.

Wākā'ndā, to reckon as holy or sacred: to worship.

Wākān'-wāтчē'pē, the sacred dance or grand medicine of which the so called (and mysterious) "medicine-sack" is the badge.

Wākā'n-wōhā'npē, a sacred feast.

* "In all the Indian tribes the doctor or medicine-man holds a rank second only, and at times superior, to the chiefs. The arts they employ, the magic they use, and the varied information they must necessarily acquire, can be obtained only by persons possessing natural

elaborate care, and occasionally in the most grotesque manner, and always has with him his medicine-bag filled with charms and simples, the precursor of the doctor's saddle-bag, and the city physician's satchel.*

gifts, and after severe trials by fasting and privation. I am of opinion from what I have observed that the principal powers by which these doctors obtain such influence among the tribes are those of mesmerism; and the stronger the physical energies to exert the magnetic development, the greater is the person possessing them considered." (Schoolcraft, vol. vi, p. 632.)

* The dress of the medicine-men varied greatly in its minutiae among the different tribes, but all bore to each other a general semblance of care and pretension. The costume in some cases was extremely ludicrous, in others horrible, and always calculated to inspire awe and terror. It was generally the skin of some wild beast, with many trinkets and a medicine-bag, including the skins of some rare animal, bird, or insect attached. The horns of animals were occasionally fixed upon the head, and thus arrayed, with rattle or drum to accompany the medicine-song, the physician appeared before his patient.

G. H. Loskiel described an Indian doctor who made his professional visits attired in a large bear-skin, so that his arms were covered with the skin of the fore legs, his feet and legs with that of the hind legs, and his head concealed in the skin of the animal's head, in which pieces of mica or some bright substance were set to represent eyes. In his hand he held a "calabash" or rattle, and was accompanied by a great crowd of people who were singing and dancing.

John W. De Forest, in his History of the Indians of Connecticut, says the Indian doctor attired himself so as to resemble a wild beast or some nondescript monster.

François Coreal, in his *Voyages aux Indes Occidentales*, 1666-'97, vol. i, pp. 39-41, speaking of the Florida Indians, says: "The *Taoûnas* were clothed in long robes made of skins of various animals cut into bands. Girdles of deer-skin were used to fasten these robes, and from these were suspended pouches containing herbs. Over all these the physicians wore, after the fashion of a cloak, the hide of some wild animal. The feet and arms are bare, but they wore on their heads caps or helmets of skins, terminating in a point."

I am aware that thus to assign a greater antiquity to the office and functions of the physician than to the

Respecting the medicine-men of the Indians of Virginia, Hariot, in his work, "A Briefe and True Report of the New-found-land of Virginia," 1590, observed that they shave all of the hair from the head except the crown, and fasten above one of their ears the stuffed skin of a blackbird as the ensign of office. The physicians, according to this account, wore simply an apron made of the skin of some animal and a medicine-bag suspended from a girdle.

According to John Lawson, speaking of the Indians of North Carolina, p. 347: "As soon as the doctor comes into the cabin the sick person is placed upon a mat or skin upon his back and almost entirely uncovered. The conjurer or doctor appears then with the king of the nation, who attends him with a rattle made of the gourd, containing loose peas or Indian corn, which he presents to the doctor, while some one brings a bowl of water." He further remarks (p. 37) that the chief doctor who came with the king of the Santee Nation to visit him was "clad in a match-coat made of turkey-feathers, resembling a garment of silk shag." They usually carried their medicines or drugs suspended from the neck in the form of a necklace, consisting of roots, barks, berries, nuts, etc.

George Catlin, in his *History of North American Indians*, vol. ii, p. 40, describes an Indian doctor, whom he saw making a professional visit, dressed in the skin of a yellow bear; the head served as a mask, the huge claws dangling at his wrists and ankles. He shook furiously a rattle with one hand, and with the other brandished his medicine-spear or magic wand. "The dress," says Catlin, "in all its parts is one of the greatest curiosities of the whole collection of Indian manufactures which I have yet obtained in the Indian country. It is the strangest medley and mixture perhaps of the mysteries of the animal and vegetable kingdom that ever was seen. Besides the skin of the yellow bear, which, being almost an anomaly in that country, is out of the regular order of nature, and, of course, 'great medicine' and converted to medical use, there were attached to it the skins of many animals which are also anomalies or deformities, which render them in their estimation medicine mystery. To this outfit there were also attached the skins of snakes and frogs and bats, beaks and tails and toes of birds, hoofs of deer, goats, and antelopes, and in fact the 'odds and ends' and fag ends and tails and tips of almost everything that swims or flies or runs in this part of the wide world."

priest is in contravention of the view which has generally been held upon this subject. Yet I think a little reflection will show that such is the fact, at least among savages. It is well known that the services of some one representing the physician are often a matter of the first necessity for the preservation of life, even among the lowest in the scale of intelligence, and for the relief of sickness or accidents to which the savage is equally liable with civilized man, and it is more than an hypothesis, it is almost a certainty, that savagery was the original state of man. In presenting this hypothesis of the origin of medicine and the medical profession I do not wish to be understood as denying that a religious sentiment is natural to man. But I believe that it, like other capabilities of our race, remains during the savage, and even the barbarous, stages of society so nearly dormant as to exercise no appreciable influence over human action.

The religious faculty, like that for language, letters, mathematics, music, the arts, and the usage of social life, depends upon development and education. In the study of the history of the human race we are constantly reminded that man is an animal. He has, by some authors, been aptly designated "a fighting animal," possessing originally but few aims or desires beyond those of feeding, fighting, and sleeping.

From what is known of the condition and habits of primitive and savage races, and from general reasoning, the following may be assumed as the probable development of human wants and the origin and line of advancement in medicine and medical practice.

Instinct is the first teacher. In some races of savages

the intellect is so little developed that it can hardly be distinguished from what we call instinct in animals. Either faculty suggests repose in a recumbent position in sickness, and the non-use of diseased and injured parts, for relief as well as for cure. It is evident, therefore, that to secure rest and administer to the few natural wants of a disabled or suffering fellow-being makes but a slight demand upon human intelligence and sympathy. Among the earliest remedies or methods of treatment or cure, and almost universally practiced by all the lower savage races, were those of sucking with the mouth, licking with the tongue, and breathing or blowing upon the diseased or painful part. Instinct leads children and many animals to do practically the same thing. There are many examples of animals eating herbs, clay, etc., when sick, which they do not when well; and it is reasonable to presume that they do so for their remedial effects. After making a distinction between the suggestions of a depraved appetite and the craving for some unusual though really suitable article of food or drink originating with the patient, which might benefit individual cases, the fact is undeniable that observation had led primitive physicians to administer and apply remedies for the cure of disease, showing a capacity to acquire medical knowledge, as well as an ability to observe and reason from cause to effect. Following close upon this advancement in medical practice, speculation as to the cause of disease seems to have next engaged attention and influenced popular feeling, and modified or controlled the notions and practices of physicians.

The earliest views the Indian has on the cause of death and of internal and obscure diseases are based on the idea that evil spirits and personal enemies cause them by conjuration and by secret or occult practices. When this belief becomes common, it develops among the race an element of fear of the unseen powers of the universe, and gradually introduces a new class of remedies, and almost a new order of physicians, who set themselves up as learned in all mysteries and capable of holding communion with the powers of earth and air. The medicines of this class are always associated with ceremonies and fetish practices, generally denominated Shamanism, and consist largely in the use of charms, amulets, spells, and incantations.

It would, I imagine, require but a slight degree of intelligence and brief experience on the part of even primitive physicians to be able to observe and to infer that a particular class of symptoms would be followed by almost uniform results; and, further, that certain symptoms were grave, and almost always led to death, while others were followed by a speedy recovery. It is almost certain that they were close observers of the attitude and heat of the body, the dryness, moisture, and complexion of the skin, rapid, slow, or painful breathing, chills, fevers, palpitations, and coughs. These and other equally significant and prominent symptoms would offer data upon which to prognosticate results with such a degree of success as to seem to ignorant savages to possess the wisdom of a prophet. The physician thus naturally became the

prognosticator in disease, and his success in this led to his attempting to foretell coming events.

Here the practice of magic begins, and seems a natural outgrowth from physic, and even antedates the development of religious ideas and observances. Fear is older than gratitude, and impulse is a more primitive faculty than reflection and judgment. It will readily be perceived that a people in the condition from which I draw this picture have not their mental powers sufficiently developed to fully appreciate laws either moral or physical. The perceptive faculties in such are as yet feeble and untrained; the imagination and emotional part of their nature is much too obtuse to speculate on a future state, or practice self-denial with a view to merit an eternal life. A belief in magic, therefore, probably represents the first recognition by man of the existence of some occult powers in nature above and not subject to himself.

As health and security from enemies were of the first importance in a barbarous state of society, these were the particular conditions which the magicians assumed to control and secure to their patrons. The Magi of the East, and other similar early orders of seers and priests, probably had their origin in this primitive condition of society.*

* The origin of magic must be placed far back in history, if not at the very dawn of human society. The art in some form has been found among all uncivilized races; and lingering traces of it may be seen occasionally at the present day. In every age and country there are credulous persons who fall easy victims to the professors of the magical art. Among all primitive nations there have been found classes of persons laying special claim to the possession of divining power, and thereby exercising great control and influence over their contemporaries. Even the most powerful and civilized nations of

It is in this stage of development and human knowledge, corresponding closely to that stage of mental

antiquity were in a great measure governed by the pretense of supernatural influence arrogated to themselves by persons whom we designate magicians. Such were the Vaidhyas of India, the Magi of Persia and Babylon, the Priesthood of Egypt, the Druids of Gaul and Britain, and probably the *Æscapiadæ* of Greece; and such also, to some extent, are the Lamas of Thibet and Tartary, and some of the present Brahmins of Hindustan. They have, in fact, existed in all pagan nations. Christianity alone has persistently and unequivocally opposed and combated the practice and the professors of magic.

Alchemy, which was the original form of chemistry, was almost synonymous with magic in early times; or it might perhaps be more properly considered a branch of the art of magic. Both words, "alchemy" and "chemistry," are derived from *Chemi*, the primitive name of Egypt; and in that land of mystery and of wonders the practice of magic reached its greatest perfection. History, both sacred and profane, is full of the juggleries of the priests of the Nile; and the reader will readily recall the remarkable and for a time apparently doubtful contest which, by means of their mysterious and magical arts, the Pharaonic priesthood waged with the representatives of Israel. The magic of Jannes and Jambres was almost a match for the miracles of Moses and Aaron.

But the word "magic" is itself of Eastern origin, and derived from the famous priesthood, or priest-philosophers, of Media and Chaldea the Magi, sometimes known as the Wise Men of the East. The Magi were the priests of Babylon and Persia, and are supposed to have been of Median or Chaldean origin; but their origin, as well as their history, and the position they held in the politico-religious economy of the Assyro-Babylonian monarchy and the Medo-Persian empire is very obscure. Neither is it definitely ascertained what their relation was to the Zoroastrian system of religion, or whether they were originally the enemies or the promoters of that remarkable scheme. But it is certain that they engrossed most of the wisdom and learning of Southern Asia; and that, by their possession, almost exclusively, of all the knowledge of the time, they were enabled to sway the minds of their more ignorant contemporaries under the pretense of the possession of supernatural powers. They became so proficient in the wonder-working art that, to the Greeks, they gave their name to that art; which

growth and culture denominated by Morgan in his Ancient Society as barbarism, that the earliest sense of a reward or punishment after death is noticed, and some practices begin which may be referred to ideas awakening to moral responsibility to an overruling Providence. It is in this stage of devel-

name has thus become perpetuated to all time, though it is very probable that the Magi themselves were merely the pupils in this art, as in other matters, of the subtle Brahmins of Hindustan. At this moment, the jugglers of India and Thibet are far in advance of those of the rest of the world.

One of the principal pretensions of magic art at all times has been the cure of the sick; and for this purpose its professors, while pretending to exercise supernatural powers and disguising their action with mysterious and meaningless movements, most frequently effected their object, as the physician now does, by their superior or exclusive knowledge of the great secrets of chemistry and the laws of physics. In the hands of unscrupulous men, this magical power was capable of the most fraudulent excesses; and hence even many ancient philosophers denounced the magicians or pretended sorcerers in the severest terms. Pliny's remarks on this subject are appropriate. I quote from the quaint translation by Dr. P. Holland, folio edition, London, 1601, vol. ii, p. 371:

"That notwithstanding it be of all arts fullest of fraud, deceit, and cousenage, yet never was there any throughout the whole world either with like credit professed, or so long time upheld and maintained. Now, if a man consider the thing well, no marvaile it is that it hath continued thus in so great request and authoritie; for it is the only science which seemeth to comprise in itself three professions besides, which have the command and rule of man's mind above any other whatsoever. For to begin withall, no man doubteth but that magicke tooke root first, and proceeded from Physicke, under the pretence of maintaining, curing and preventing diseases: things plausible to the world, crept and insinuated farther into the heart of man, with a deepe conceit of some high and divine matter therein more than ordinarie, and in comparison whereof, all other Physicke was but basely accounted."

opment, too, I believe, that the priestly functions are first observed. As a class, the priest-physicians are extremely self-reliant, and aspire to exercise the authority of prophets and lawgivers and to rule supreme. They assume also many of the functions of the physician, and at times wholly absorb his office, and are often successful in their efforts to gain control in the affairs of government. We find that the dual quality of priest and physician has prevailed in all stages of civilization and under every form of government, and has even continued down to our own time.

However, there seem to have been at all times among barbarous tribes physicians who made no pretensions to priestly prerogatives or mysterious practices, but who relied upon the use of remedial agents for the cure of disease. Medical science has already made much progress among a people whose physicians are able to determine something of the cause of disease and the organs of the body involved, and to select and administer remedies internally which are capable of giving relief or effecting cures. This period I shall denominate the third stage of medicine, and has its beginnings in agricultural and semi-civilized races, but in most cases antedates written records. It is evident to every reflecting person that the exhibition of a proper internal remedy for a disease requires a much more complicated process of reasoning, and a more accurate knowledge of the various organs of the body and the effects of medicines, than does the application of external remedies.*

*As corroborative of the views presented of the origin and antiquity of medicine, I will make a few brief references to its history among

Time will not permit me to dwell further upon this subject, but the few facts presented will, I trust, ren-

the ancient nations whose mythology bears testimony to the very early appearance of the physician, as well as to the general and high esteem in which the art of physic was held. The habits and mental peculiarities of uncivilized races being considered, it is probable that the prominent mythological divinities of remote antiquity had their origin from individuals who, by the possession of genius, became leaders among the people. Success not only makes but crowns the hero, and the eminent service that wins applause may soon command obeisance from the multitude. The hero of one generation easily becomes the divinity of another. Frequently the early history of mankind attributes to the same exalted character many special qualities, and sometimes divine powers. Hence it is that a number of the great names honored as divinities by the early Hindoos, Egyptians, Phœnicians, and Greeks, were noted for their skill in physic.

It is a fact worthy of remark that nearly every nation has referred the source of its medical knowledge to the gods. The Egyptian god of medicine was Hermes, the Mercury or Hermes Trismegistus of the Greeks. He is perhaps the oldest physician on record. By the Egyptians his name is variously designated, as Thoth or Thuti; and Taaut. To him is attributed the invention of medicine and the sciences, and also letters and a written language, and he is denominated the adviser and secretary of Osiris. In a word, he is represented as possessed of such a wide scope of knowledge as to have been invested in the eyes of the people and his contemporaries with almost superhuman qualities. Of course no certain period can be fixed as the time when he lived, but probably 3,000 years before the commencement of the Christian era would not be early enough. Mr. Ebers, the German archæologist, in the winter of 1872, obtained, in the vicinity of Thebes, a roll of papyrus over 60 feet in length and 11 inches broad, closely written in unknown characters, relating to medicine. The date of this document has since been determined to be 1552 B. C. It is in good condition, and has been photolithographed. A few pages have since been deciphered and the whole published. In time scholars will master the record, and should it prove to be genuine it will be the oldest work on medicine extant, and possibly prove to be one of the six books attributed to Hermes. A copy of the work may be seen in the library of the Surgeon-General, at Washington, D. C.

der it probable, if not conclusive to most minds, that the physician must have held a most conspicuous and

The medical precepts of the Egyptian god of medicine, it is stated, were collected after his death and embodied in a volume under the title of "Embre," which possibly embraced the six Hermetical books. For centuries this work constituted the code of medical practice for the oracles and priest-physicians of Egypt. Following Hermes and almost equally celebrated in the medical annals of Egypt were Apis and Serapis, who after their deaths also received divine honors. It is surmised that the Greeks adopted, under slightly varied names, many Hindoo, Phœnician, and Egyptian deities. And indeed it is possible that Isis and Osiris are only appellations of particular ages, or of special localities, for the more ancient Egyptian deity Hermes. The Hellenic deities Apollo, Pæan, Orpheus, Mercury, Æsculapius, Melampus, Hercules, and Castor, may each have had their prototype in, or may have been adopted from, the older civilizations of Hindustan, Phœnicia, or Egypt. This hypothesis will at least account for the god Taaut or Hermes of Egypt becoming the Mercury of Greece. From the Hellenic character given to Mercury as dressed in winged sandals and cap, he was the recognized messenger of the gods, and brought the art of medicine down from heaven. In such veneration was he held that the early astronomers honored his name by giving it to the planet nearest the sun, and because it makes its circuit in less time than any other. His caduceus or staff has at the head two wings, and is entwined by two serpents. This scepter is the ensign of peace; and mythology claims that it was obtained from Apollo. Nearly the same emblem is represented as the staff of Æsculapius.

Medicine was specially honored in Greek and Roman mythology and the antiquity of the art of the physician is indicated by the fact that there are in the figures of the Zodiac two stars named after physicians, Chiron and Æsculapius. These figurative characters had doubtless prototypes in real personages, who had won, by their skill, great distinction among their contemporaries, who were led in their admiration to consider them not only heroes, but gods. The esteem in which the art of medicine was wont to be held in those early times may be inferred from the testimony borne by that passage in the Æneid where Iapis is introduced to heal the wounds of Æneas. It is stated that Apollo, wishing to reward Iapis for his services, told him

important place in every stage of civilization since the genesis of man upon earth.

to choose between all of his arts and gifts the one which he preferred, whereupon Iapis from the store-house of the universe chose the art of medicine. The Greeks derived the origin of their medicine from Chiron, the Centaur of Mount Pelion, in Thessaly. He is represented as the teacher of Æsculapius, and was placed by Jupiter among the stars in the constellation of Sagittarius. It was an easy matter for such a people to invest the dwelling-place of their beloved physicians with all the character of a revered temple. Chiron was instructed in medicine and the art of prophecy by Apollo and Artemis. He was also renowned for proficiency in music, hunting, and gymnastics. His statue is one of the noblest specimens of art, combining the human and animal form, that have come down to us from antiquity.

Mountaineers and uncivilized races living in forests have always been supposed to have special opportunities to discover herbs of rare curative virtues, and people living in agricultural districts and indeed in cities yield an admiring faith in the remedies proffered by them. Instances of this credulity are very frequent in our own times, where pretended Indian physicians and inventors of new medicines, who have received no training in the art of physic, are rewarded and honored, while men of science are neglected and their opinions disregarded.

It will be recollected that the constellation of Serpentarius was originally known by the name of Æsculapius, the god of medicine. There are conflicting accounts of the descent of this physician, but he is generally represented to have been the son of Apollo. In the earliest accounts of him he is spoken of as a man, and referred to by Homer as the "Blameless physician." His sons, Machaon and Podalirius, were also physicians, and served as surgeons in the Greek army at the siege of Troy. So skillful and renowned did Æsculapius become that it was believed of him that he could not only prevent disease, but that he could also raise the dead to life.

In all ages distinguished merit has had its penalties to pay, and Æsculapius was no exception to this rule. Pluto conceived that this power of curing all diseases and raising the dead interfered with his rights, and appealed to Jupiter, who killed Æsculapius with a stroke of lightning. After the death of Æsculapius he received divine honors. Temples were erected to him at Epidaurus, Cos, Cnidos, and Rhodes. Here it is apparent that religious honors and

The priest deals with the ethics of man's nature through the higher faculties of the mind, "will, memory, and understanding." These, and particularly the latter, are feebly developed and but little exercised by people in a state of savagery. The instances recorded in history are numerous where the Indian physician,

priestly functions were engrafted upon a fame won by the art of medicine. Homer represents Apollo, a god of medicine, as arresting a pestilential disease that existed in a Greek camp, at the earnest prayers of the priests, who thus recognized the distinctness and efficacy of the medical profession.

A careful study might enable us to point out the origin and sequence of the various professions, which have arisen, one after the other, to meet the increasing wants of a developing civilization. We find that in Egypt medicine and all of the physical sciences, particularly hydraulics, geometry, surveying, etc., as well as law-making and the administration of civil government, were all early assumed by the priesthood. This hierarchy wisely employed those skilled in the various departments, but surrounded all their operations with such ceremonials and secrecy as to strike terror into the minds of the uninitiated. There fortunately grew up in the different departments of this theocratic government a desire for original investigations and a system of records of the facts observed, which were preserved in the temples, so that a sort of common law was evolved for the benefit of every department of the government, and a code of principles or law, for the guidance of human desires and industries. In this way, too, were collected the earliest observations of disease, and a record of them preserved, with the means found most effective in their cure.

Those wishing to prosecute the study into the origin of medicine will do well to consult Herodotus and Strabo. The former of these authors tells us that in Egypt the faculty was learned and divided into specialties. And Pliny informs us that the physicians of Egypt made post-mortem examinations to discover the hidden causes of disease. From Homer's *Odyssey* we learn that the physicians studied the nature and properties of drugs, that Egypt contained many that were salutary and others that were pernicious, and that her physicians were possessed of knowledge exceeding that of other men.

his remedies and modes of practice, are mentioned, but no allusion is made to the priest. And quite often the declaration is distinctly made by travelers, that particular peoples and tribes had no religious observances or priests, and no belief in God, or even a word in their language that would express the idea of a Creator and Supreme Ruler of the Universe.

In confirmation of this I shall only refer to the testimony of two, that of Rev. Father Baegert, a Jesuit missionary who lived among the Lower California Indians for seventeen years, dating from 1751, and that of Rev. Father Lewis Hennepin. I quote from a translation of Father Baegert's work, as published in the Smithsonian Report for 1864, p. 390.* In speaking of the California Indians, he says: "They had no magistrates, no police, and no laws; idols, temples, and religious worship or ceremonies were unknown to them, and they neither believed in the true and only God, nor adored false deities."

As fully corroborative of this statement Father Hennepin, at page 58 of the Continuation of the New Discovery of a Vast Country in America, says: "I cannot tell whether their [the Indians'] predecessors have been acquainted with any deity or not, but sure I am that their language, which is otherwise very ex-

* Charles Rau, translator, says: "According to Father Piccolo, the Californians worshiped the moon, and Venegas mentions the belief in a good and bad principle as prevailing among the Pericues and Cotchimis." (Waitz's *Anthropologie der Naturvolker*, vol. iv., p. 250.) These statements are emphatically refuted by the Rev. Mr. Baegert in his first Appendix, p. 315, where he says: "It is not true that they worshiped the moon, or practiced any kind of idolatry."

pressive, is so very barren in that, that they have no word to express God or any the least of our mysteries." "These people acknowledge no deity with a sense of religion." "They have no exterior gestures which might convince us they had the least esteem for a deity; neither temple, priest, sacrifice, nor any other mark of religion is to be met with among them." "A man must not go to America, that has a mind to become a martyr for his faith. These savages never murder anybody on that score; they leave every one at liberty to believe what he pleases."

It is proper to remark, however, that the Indian races no longer represent man in a low state of savagery. All the North American Indians use the bow and are acquainted with the use of fire, and have probably not been cannibals, with rare exceptions, for centuries before the discovery of this continent by Columbus.

Of the habits of man in a primitive state we have no knowledge, except what can be gathered by inference from isolated savage tribes. The Indians of to-day must be regarded as having passed out of a state of savagery, though they represent a stage of barbarism.*

It is well known that nearly all American races have acquired some of the arts, such as the making of implements, pottery, dwellings, clothing, etc. With this progress their early customs and habits have changed. But all tribes have not moved forward with the same regularity and rapidity; climate and food probably determine this to some extent. However, by drawing ex-

* For a comprehensive distinction between the condition of savagery and that of barbarism, see Lewis H. Morgan's *Ancient Society*.

amples from those but little advanced we will find facts sufficient for the present purpose.

The Indian is patient in suffering, courageous in visible danger, but apprehensive of the unknown and occult powers of nature which environ us, but which are so much more of a mystery to him than to civilized man, as often to transform the hero into a coward. It is unquestionably true that the uncivilized as well as the semi-civilized Indians have many unmeaning practices and superstitions; chiefly because they know nothing of remote or secondary causes. Like all unlettered races, they are fond of ceremonies and spectacular exhibitions, and the person among them who becomes the most expert in these and acquires the most comprehensive knowledge of the laws of nature is at once elevated to the rank of "a medicine-man" or physician. Poorly qualified as are their physicians, they have among them pretenders to medical knowledge, mere jugglers, who practice by incantations, the exhibition of charms, and other fetish measures which appeal almost exclusively to ignorance and credulity.*

* Every physician and reflecting person can recall dozens of charms made use of, or worn, even by intelligent people, which are purely fetish in character and without influence. Some of these proceedings and "cures" are handed down from generation to generation, and can be traced far back into the early ages. I will only record a few: As a strap of eel-skin worn around a limb to strengthen a joint and to prevent or cure a sprain. The carrying of a buckeye-nut in the pocket to prevent or cure the piles. The carrying of a raw Irish potato in the pocket to cure or ward off rheumatism. The wearing of a black ribbon around a child's neck to prevent croup. The wearing the rattles of a rattle-snake about the head to prevent headache. To remove warts, the tying of a string or thread over the wart and then

The Indian, in common with all branches of the human race, has faith in panaceas, and this belief with him, in the absence of a knowledge of physical laws, renders him the ready victim of those who profess to operate through the arts of magic and appeal to supernatural agencies.

But while this is true, we may with justice ask, what profession, science, or art in any age, country, or stage of civilization has ever been free from superstitions and impostors? And, while condemning follies in the Indian, we must, I think, recognize the fact that all culture, civilization, and religion in the most enlightened nations are the result of forced training; or, in other words, conditions not natural to man. Reason and knowledge are therefore neither stable in quality nor uniform in quantity in a nation. The people that desires to maintain them at a high standard of excellence must be on a constant strain. To pause in the support of them will be to retrograde. And it is quite as important to recognize the fact that errors and false principles are also the result of education, or a sentiment, and dominate judgment and incite to

burying it. There are many other charms for removing warts. The wearing of a thread of gray woolen yarn around the leg to prevent cramps. To prevent nightmare, by the placing of a pair of scissors, or some cutting instrument, under the pillow. To cure toothache, pick the tooth with a nail taken from a decayed coffin. To cure or prevent whooping-cough, the wearing of a leather string around a child's throat. The rubbing of a "mad-stone" on the wound for the cure of a bite of a mad dog. Bags of sulphur, camphor, assafetida, etc., worn to prevent contracting contagious disease. Nailing of a horseshoe over the door of houses and stables for good luck. It would be an easy matter to greatly extend this list.

action just as strongly as does the truth. There are more martyrs to false theories than to true principles. What is Truth? seems as difficult to answer now, as when the Roman Governor of Judea propounded this momentous question. Toleration, or rather mental liberty and emancipation from dogmatism, is a rare and heavenly virtue born of the Saviour, but has neither apostles nor disciples. It has no saints, no shrines, and few true worshipers.

That Indians are controlled in their conduct through life by a different philosophy from that which governs educated Christians is very evident. It is particularly noticeable in their treatment of the sick, but less so in their surgical practices. Most of their remedies are administered or accompanied by some incantation and ceremonial jugglery. However, from the testimony of reliable persons who have lived for years among them, as well as from written history, they have always had practitioners, taught by experience how to administer medicines with more or less judgment. With some tribes the physician is held to a responsibility that is equivalent to an obligation or contract to cure, not merely to treat his patient according to the best of his ability. This is to be inferred from the fact that some of them held the physician accountable for the recovery of those intrusted to his care; and when death instead of recovery took place, the disappointed friends had, and occasionally exercised, the right to take the life of the doctor. This cruel treatment is no doubt in part based on the prevalent belief that the physician has the power to inflict disease as well as to cure it. But we know enough of human

nature to see that this is but an exaggeration of a natural feeling, excited by disappointment, which culture and civilization have subdued or controlled.

Henry, in his *Travels in Canada*, gives an account of an Indian physician he saw put to death by the infuriated friends of a deceased patient. Many other authors corroborate the existence of this custom.* Father Hennepin says that in case of failure on the part of the Indian physicians, jugglers, and priests, to cure a patient, it is ten to one that the parents or friends of the deceased will kill the physician on the spot without any formality. Alexander Ross, in his *Adventures on the Oregon River*, p. 304, records what he observed of the treatment of medical men when they fail to cure, by the Flathead Indians, and says: "On whomsoever (physician) their imagination fixes, be he far or near, he is secretly hunted out, waylaid, and put to death; and this is generally the fate of all of them." In the published account of Captain Wilkes's exploring expedition (vol. iv., pp. 368-9) it is stated that the Indians of the Willamette Valley frequently kill their medical men when they fail to cure. They even apply this rule to white physicians or others who take the risk of prescribing for the sick. Captain Wilkes records the instance of the killing of Mr. Black, who was not a physician, but who had

* Father Charlevoix's *Travels in Canada*, p. 271; Alex. Henry's *Travels in Canada*, p. 124; Rev. Samuel Parker's *Journal of a Tour beyond the Rocky Mountains*, p. 245; C. C. Jones's *Antiquities of the Southern Indians*, p. 33; Hunter's *Narrative*, p. 352; Hennepin's *Continuation of Discoveries in America*, p. 59; Wilkes's *Exploring Expedition*, vol. iv., p. 368.

lived for many years among these Indians, and of whom they were very fond. Out of sympathy for one who was suffering, he prescribed medicine. The patient not recovering, the friends of the Indian shot Mr. Black. This gentleman had published some valuable accounts of the geography and products of this region, and was a great loss to the early traders and settlers in Oregon. General Alvord, of the United States Army, observed this barbarous conduct among the Indians of Oregon.* Father Charlevoix, p. 188, says: "The Indian sorcerer is safe nowhere, and condemned to the punishment of prisoners of war. Those who are least culpable are knocked on the head before they are burned." The physician is usually paid his fee or receives a present as soon as he enters the cabin. In some cases stipulation is made for payment in advance (this, however, is not the general custom), and occasionally fees are returned should the patient die. The Indian physician receives almost any article proffered, as arms, skins, robes, moccasin ornaments, or food, a dog, a horse, etc.

It is a notable fact, and particularly in the East, that the physician among early races, whose origin is referable to Semitic stock, is frequently the head of the family or tribe. Indeed all rank and tribal authority in races having this descent seem to be patterned after the patriarchal form, where the head of the family

* General Alvord has given an interesting account of this cruel practice among the Oregon Indians in a paper which he read, January 20, 1877, before the Literary Society in Washington, and which I trust will soon be published. He contributed similar facts to Mr. Schoolcraft, which are published in the fifth volume of his work, p. 652. Mr. Schoolcraft, on p. 271, refers to this practice among various tribes.

or tribe constitutes himself the ruler, physician, and priest. The reverse of this usage or system obtains among the North American Indians and most uncivilized races, not of Semitic origin. The chief among the Indians is chosen for his recognized bravery or other personal qualifications. To some extent age is respected, and particularly when associated with rank; but there is no hereditary descent of office or position. While the priestly function may be associated with that of the physician, the chief or king rarely, or perhaps never, combines either with his tribal or rather martial office. The professions seem to be open to the fullest competition, even females aspiring to the honors. Captain Wilkes (vol. iv., p. 399, of his Expedition) describes the practice of a female physician among the Walla Walla Indians of Oregon.

To appreciate the Indian physician at his real worth he must be judged of from a standard of proficiency that will take into account his actual knowledge, environments, and the wants of, as well as the degree of intelligence possessed by, the tribe to which he belongs, and not measured by the exactions which civilization and Christianity have established for the nineteenth century. As it is my desire to discuss Indian medicine as it existed when this continent was discovered, or at least before its system was modified by contact with the whites, it is but proper, in comparing it with the best practice of to-day, that we should remember the progress the science of medicine has everywhere made within this period. I will not take up your time with an account of their extreme ignorance of physiology and their absurd and foolish methods

of cure through magic. I seek rather to present them fairly, if not at their best. With this explanation of the standard by which to estimate the skill of the Indian physician in the treatment of the ills common to their condition and modes of life, it presents, in the main, no mean degree of success. It is nevertheless true that their strange and ridiculous maneuvers and jugglery offend the common sense of the present day, and were doubtless often carried to an extent that lost sight of the essential points in the treatment of the sick.*

The theory of disease held by the Indian was so entirely different from that of the educated physician of the present age, that it is proper his practice should be viewed in connection with it. It was believed that disease was produced by evil spirits, and that the medicine-men had power to hold close communion with the unseen, and thus discover the secret causes of all disorders and by incantation insure their expulsion. Notwithstanding this absurd notion, they were not entirely ignorant of the functions of some of the

*Catlin says that all tribes have their physicians, who are also medicine or mystery men. "These professional men are worthies of the highest order in all tribes. They are regularly called and paid as physicians to prescribe for their sick, and many of them acquire great skill in the medical world and gain much celebrity in the nation. Their first prescriptions are roots and herbs, of which they have a great variety of species, and where these have all failed, the last resort is to 'medicine' or mystery." The fact is mentioned by many authors that the physician is always dressed with elaborate care. Drawings of the physicians' costumes may be seen in Catlin's *History of North American Indians*, vol. i., p. 40. The doctor's dress is graphically described in *Lawson's History of North Carolina*, p. 37, and in *Loskiel's Mission of the United Brethren*, p. 111.

more important organs of the human body.* These they learned by the analogy the organs in man bore to those of the animals which they were accustomed to kill and cut up for food. They were cognizant of the fact that the lungs are the organs of respiration, that the heart is necessary for the circulation of the blood, and that a suppression of the action of the kidneys would be fatal to life.† The more urgent demand for the skill of the physician would be conditions growing out of accidents, more or less severe, such as fracture, luxations, and incised wounds. In the treatment of these the red man's physician occasionally displays much common sense, mingled with mystery. Every warrior is expected to have some knowledge of the healing properties of plants and roots, in order that he may intelligently treat such diseases and accidents as are likely to occur when on the war-path or on a hunting expedition. Their necessities taught them efficient modes of transporting those who became disabled on the march. Dr. Pitcher describes the litters they constructed, of two poles

* Dr. Zina Pitcher, in Schoolcraft's *History of the Indians of the United States*, p. 505.

† Dr. Brickell, a physician who lived for many years among the Indians of North Carolina, says: "I never observed any of them to practice anatomy; neither do I believe they have any knowledge therein, unless they make a study of the skeletons of their kings and great men's bones." (*Brickell's History of North Carolina*, p. 339.)

Schoolcraft, vol. v., p. 501, says the Indians have "distinct names for the heart, lungs, liver, gall, spleen, windpipe, and other functional parts." In the same volume Dr. Pitcher relates an anecdote to show how the experienced Indian hunter, from an examination of the ovaries of the beaver, will predict from the scars found the number of young she has had, and therefore the number he may expect to trap.

lashed to cross-pieces by means of bark and then woven or filled in with strips of bark to form a web or mat upon which the wounded are placed and carried by four persons. A method somewhat similar for carrying the disabled is mentioned by Father Jacob Baegert as resorted to by the Southern California Indians. "They placed," he says, "their sick or wounded on a rude litter made of crooked pieces of wood, which would constitute a rack to any but Indian bones;" but adds, "the carriers were in the habit of running with their charge."* An incident recorded by Alexander Henry evinces the ability of the hunter to arrest hemorrhage from an artery by compression. An Indian on his wintering ground trapping beaver, when at a distance from his lodge slipped on the ice and, falling on his hatchet, nearly severed his hand at the wrist. Taking off his shirt, he tore it into strips and bound it tightly around the arm above the wound, thus stopping the flow of blood, and walked three miles to his cabin. The hand was then detached, thus completing the amputation, and the stump dressed, which healed rapidly.†

When necessary to cleanse deep wounds Indian physicians made use of expedients, some of which are worthy of mention. For instance, they constructed a

* Smithsonian Report, 1874, p. 387. The same or nearly similar methods are mentioned by Schoolcraft, vol. I, p. 254, and by other authors. See also Surgeon G. A. Otis's report on the removal or the transportation of sick and wounded by pack-animals to the Surgeon-General, U. S. A., 1877.

† Travels and Adventures in Canada and the Indian Territory, by Alex. Henry, pp. 122, 123.

syringe made of a bladder with a quill inserted in it for a nozzle, through which they forced water or any decoction they wished to use for this purpose.* Suction both by the mouth and through tubes is resorted to for removing foreign bodies from wounds, as they wished to avoid enlarging them, and looked upon a practice that did so with disfavor. Tubes made of stone and other substances seem to have been much used, and are frequently found in Indian graves. These tubes also served as a sort of cupping instrument and for blowing through to cool inflamed parts, to remove foreign bodies, and for conveying water forced from the mouth in washing out cavities and wounds not readily reached. Their surgeons took special care to remove all foreign bodies from wounds as soon after an accident as possible, which they accomplished with care and much dexterity.†

Numerous instances are recorded of their applying dressings of cold water, and also poultices of Indian meal, slippery-elm bark, and a variety of roots, herbs, and other substances. Dr. Pitcher states that they coaptate and hold in position incised or other wounds by means of sutures made of the tendons from the leg of the deer. These they introduced with a needle made of bone. A slender fiber from the center of the tamarack, and also the inner bark of the bass-wood, were used as threads for sewing up wounds. The rule was not to remove the sutures until after the sixth day. And

* Charlevoix, Pitcher, and others.

† Loskiel's Mission of the United Brethren, p. 112; Captain Jonathan Carver, p. 257; and Father Charlevoix, p. 268.

while they were averse to enlarging wounds, nevertheless they were aware of the advantage of having them heal from the bottom. To insure this, they inserted tents of slippery-elm bark in deep wounds to keep them open.* According to Brickell, from the manner in which the Indians of North Carolina treated the prisoners taken in war, and whom they desired to keep as slaves, it is evident they knew that in amputation it was important to preserve a flap of skin to cover the end of the bone. The method they adopted for preventing the slave from running away was to maim him by cutting off one-half of each foot. "They flayed the skin from the setting in of the toes to the middle of the foot, cut off one-half of his feet, wrapping the skin over the wounds and then healing them."† Lawson, in his History of North Carolina, testifies to the same practice, and to their skill in arresting hemorrhage. Alexander Henry, before referred to, records the case of a man wounded by an axe penetrating the lung, which was followed by profuse hemorrhage. Air escaped from the lung through the opening, yet this was so successfully treated the Indian was alive twenty years afterward.‡

Loskiel says a hunter accidentally dislocated his

* The practice of introducing slippery-elm tents into deep wounds is described by Pitcher. Hunter, already referred to, alludes to the same practice, and to the use of the pulverized bark in poultices, p. 398.

† Dr. John Brickell, in his Natural History of North Carolina, published in Dublin, 1737, pp. 321 and 399; John Lawson, in his History of North Carolina, pp. 322, 323, records the same fact and in nearly identical language, so that there is not much doubt but the flap operation in amputation was practiced as early as 1700 in North Carolina.

‡ Henry's Travels, already cited, pp. 124, 125.

thigh when alone in the woods, and replaced it by fastening one end of a strap to the nearest tree and the other to his dislocated limb, and then forcing himself away from the tree by the uninjured leg in such a manner as to make traction and replace the dislocated joint.

The Indian physicians were aware of the assistance gained by securing muscular relaxation in replacing dislocated limbs.* Fractures, according to the statements of Dr. Zina Pitcher, Father Charlevoix, and Loskiel, were treated by placing the injured limb in splints made of birch or other bark, carefully fitted to the part, and fastened by bark bandages, so as to keep the bones in their position. Ross Cox, in his *Adventures on the Colorado River*, page 125, says the Flathead Indians treat fractures by "bandages and pieces of wood like staves placed longitudinally around the part, to which they are secured by leather thongs." I find no mention of any means used by them for extension or counter-extension in fractures. Of course, shortening of limbs must have occurred in certain cases for want of such treatment.

The testimony is general that but few deformed or crippled Indians were to be seen. These Indians cure rheumatism by cold baths, which they use in conjunction with the steam-bath, often breaking the ice to plunge into the cold water. Bancroft states that the Haidah Indians of the Pacific Coast, to arrest hemorrhages from bites or wounds, use eagle-down to

* Loskiel, p. 112. Hunter, p. 397, says they were acquainted with the advantage of relaxing the muscles in dislocations, and gave medicine to produce nausea for this purpose.

thrust into the wound or bind upon it. Pitcher states they used the ordinary puff-ball for arresting hemorrhage, and in epistaxis plugged the nostrils with it and with pulverized charcoal. Smith, in his History of Virginia, speaks of the inveterate character of ulcers, and Dr. Zina Pitcher remarks that those of an indolent character were sometimes treated with a salve made of fresh ashes and tallow or powdered calamus, and adds that the actual cautery was at times used in these cases. The Indians treated boils and phlegmonous ulceration by scarification and lancing, and by poultices of Indian meal, slippery-elm bark, wild onions, etc. The Indians of Cape Flattery (see Smithsonian Report for 1870, p. 79) used a poultice of oysters and fresh fish. They made use of the actual cautery and a moxa made into a cone from the dried inner bark of the white pine. The part of the body selected for the moxa is prepared by moistening, the cone is then placed in position and ignited, which burning leaves a deep sore. This is kept open by removing the scab until relief is obtained. It is a favorite practice among these Indians to use external cautery for all internal diseases, on the theory that it serves the double purpose of blistering and bleeding.

Beverly (History of Virginia, second edition, 1722, pages 186, 187), says that when pain is seated in a limb or joint the general cure is by burning. Their method of doing this he informs us "is by little sticks of lighted wood, the coal of which will burn like a hot iron; the sharp point of this they run into the flesh, and having made a sore keep it running till the humor be drawn off." They also use the punk or touchwood

made into canes and used as a moxa, burning it over the seat of pain, so as to form a sore. Charlevoix remarks that they possessed several cauterants, prominent among which was rotten wood, probably punk. Pitcher says that for hernia they used bandages with pads, but when strangulation ensued they were unable to afford relief.

By some historians the toothache is stated to have been comparatively common among the Indians. Loskiel states that they used in this affection an application of the bark of the white walnut to the cheek, and when relief was not obtained by such remedies, Brickell tells us the tooth was punched out, by placing a piece of cane against it, which was then struck in such a manner as to drive the tooth out, which is done without injury to the bone. The same author speaks of the success of the Indian physicians in their treatment of burns. Similar testimony is given by Loskiel, who says they made applications of a decoction of beech-leaves in such cases. A long list of the medicines used by the Indians may be seen in Hunter's Narrative, in Schoolcraft, and in a recent report by Major Powell. Loskiel, in referring to long confinements which produce bed-sores, states that they adopt the following method for the comfort and relief of the patient. They make a soft bed of straw, and under the part where the buttock rests they make an aperture to relieve pressure and through which the natural evacuations may take place.

Bleeding was a common and popular practice among nearly all tribes. Henry, in his travels, says it was held in such general favor that even those in good

health resorted to it, and states that on one occasion he bled a dozen women as they were seated on a fallen tree, commencing with the first and opening a vein, then the second, and so on, three or four bleeding at one time. This operation is performed with a sharp flint, in the arm, and sometimes in the foot. Next to that of bleeding, cupping was a popular remedy, and performed in the following manner: Over the seat of pain or part to be cupped they would scarify, and then place over this a gourd cut off near the end, which served as a cup. They half-filled this with combustible matter, which, burning rapidly, exhausted the air, forming a vacuum in the gourd, which, when placed on the part, made an admirable cup. Another mode of cupping, related by J. C. Beltrami, Dr. Pitcher, and others, was as follows: After lacerating the skin with a sharpened bone or flint, the large end of a buffalo-horn was applied over the incisions. Exhaustion in this case was produced with the mouth applied to the small end of the horn, which was perforated. The blood by this method is discharged through the mouth of the operator. Carver states that they sharpened flint-flakes by grinding or whetting them on a stone, so as to be quite efficient as a cutting instrument for scarification. Brickell states that for scarifying the North Carolina Indians used the teeth of the rattle-snake from which the poison had been extracted. "Scarification was frequently resorted to," says Father Hennepin, "for the relief of pain and swelling, even where cupping was not practiced."

According to Father Charlevoix, Henry, and others, the gout, stone, and apoplexy are unknown among

the Indians, and to this list Heckewelder adds rickets and scrofula; and Dr. Brickell says that dropsy, diabetes, gout, stone, consumption, asthma, palsy, struma, and a host of European diseases, too numerous to mention, were completely unknown to the Indians of North Carolina. Hunter says that the diseases most common are rheumatism, asthma, fevers, pleurisy, and bowel-complaint. Smith, in his History of Virginia, records the fact that dropsy was sometimes prevalent among the Indians of that section.

Jones, in his Antiquities of the Southern Indians, p. 33, states that the treatment of diseases by them did not depend so much upon the giving of medicines as it did upon strict attention to regimen and abstinence. Father Charlevoix bears testimony that the doctor never refused the patient anything that he desired to eat, under the belief that "his desires in this state are the orders of the genius that presides over his preservation." Loskiel says that the sick were given as diet a thick soup of pounded corn-meal. Carver says the physicians refuse their patients no sort of food they desire, and are never alarmed for their recovery unless all appetite be lost. Lawson in his History of North Carolina, already referred to, at p. 39, says: "I have seen such admirable cures performed by these savages, which would puzzle a great many graduate practitioners to trace their steps in healing, with the same expedition, ease, and success; using no racking instruments in their surgery, nor nice rule of diet and physic, to verify the saying, *qui medice vivit, misere vivit*. In wounds which penetrate deep and seem mortal, they order a spare diet with drinking

fountain water ; if they perceive a white matter or pus to rise, they let the patient move at large, and presently cure him."

C. C. Jones says the physicians occasionally required their patients to lie upon their stomachs with their heads over pans in which medicinal plants were being boiled, so that they might inhale the medical properties. The sweat-bath was an institution in every village or camp, and used not only in health, but for nearly every ill from which they suffered. Charlevoix, Brickell, Furman, and Pitcher give an account of a mode of administering an earth sweat-bath, which was to open a dry sand bank, or the earth where wood had been burned and before the ground had become cold, sufficiently deep for a man to lie down in, wrapped in a blanket. The patient is then covered over with the earth excepting his head, and left for hours.

Carver, Charlevoix, and Pitcher mention the frequency of pleurisy among the Indians, which was treated by poultices and other external applications, some of which were of a rubefacient character. They also bled in these diseases. Consumption is mentioned by the same authors. Heckewelder claims that consumption had become more frequent among the Indians after the introduction of alcoholic liquors. Loskiel tells us that in consumption the flesh of the rattlesnake is made into broth and administered with good results. De Forest, in his History of the Indians of Connecticut, mentions the existence of quinsy, which was treated by sweat-baths. As might be expected, rheumatism, both in the acute and chronic form, was a common disease among the Indians, old and young.

It was treated, says Loskiel, both by scarification, cupping, anointing with oil, rubefacients, and also by poultices of a plant called jalap, the bark of the white walnut, etc. Brickell, in his History of North Carolina, p. 398, states: "They have a kind of rheumatism which generally afflicts their legs with grievous pains and violent heats; while thus tortured, they employ the young people continually to pour cold water upon the part aggrieved until such time as the pains are abated and they become perfectly easy, using no other method for this kind of disorder." Thus it will be seen that the American Indians early discovered the advantage of reducing high temperature by the application of cold water.

Typhus fever was probably unknown to them, but the malarial and bilious fevers were common throughout the tide-water region and southern low lands. These were treated by decoctions of herbs and cold lotions, but the names of the ingredients have not been preserved. Father Hennepin, in speaking of the fevers, says that to cure the tertian or quartan fevers and agues they used a "decoction of the bark of a tree." Many tribes of Indians in the beginning of fevers used emetics, which they prepared from a variety of sources, as "the spurge, thorough-wort, etc." As purgatives they used the euphorbium and horse-chestnut, white walnut, etc. Much reliance in breaking a fever was placed on the hot and cold baths combined, a powerful reaction being produced by the transition from a profuse sweat to a plunge or douche of cold water. The want of knowledge of the true nature of exanthematous diseases, which were treated by the

same methods employed in other complaints, no doubt occasioned many deaths.

Dysentery and diarrhœa are mentioned by a number of authors as existing among the northern and western tribes. Father Charlevoix, Loskiel, and Dr. Pitcher state that these diseases were both treated by a decoction of the root of the low blackberry, the juice from the cedar-tree, etc.

Paralysis is mentioned by Brickell, Lawson, Pitcher, Carver, and Charlevoix, who allude to it as a rare disease. The latter mentions the fact of an Indian suffering from epilepsy being cured by a bolus administered by an Indian woman, but has not informed us of what the bolus was composed. Lewis and Clarke, in their journal of an expedition to the Pacific, mention the frequency of sore eyes among the Indian tribes of the plains. Brickell, in alluding to skin-diseases, states that they are readily cured by plants collected by the Indians, and that scald-head was invariably cured by the application of an oil made from acorns.

The testimony is almost universal that Indian women suffered but slightly in childbirth. The little aid rendered them was generally by females. Lawson, however, in his history of North Carolina, states that no disadvantage was suffered for want of "midwives, for these, as well as doctors, are well skilled in the practice and render labor less difficult." His language gives the impression that males as well as females rendered service in these cases.*

A singular proceeding, in a difficult and protracted labor, calculated to bring on partial suffocation in the

* Schoolcraft, vol. I, p. 225 ; 2, p. 65.

parturient woman, is related by Carver, p. 260. He describes a case where the surgeon, midwife, and friends despaired of the life of the patient, but who was promptly relieved by an Indian woman, who "took a handkerchief and bound it tightly over the nose and mouth of the parturient woman. This immediately brought on a suffocation, and from the struggles that consequently ensued she was in a few seconds delivered." The insensibility and relaxation produced by this treatment may have relaxed the muscles, and in some respects resemble a state of anæsthesia.

The question of the origin of syphilis is one that, since shortly after the discovery of America, has caused much discussion in the medical profession.*

* The writer who first asserted the American origin of syphilis was Leonhard Schmauss, a German physician, who wrote in 1518, twenty-five years after the disease appeared or was recognized as existing in Italy. He was followed by Ulrich Van Hulten, Oviedo, and others, who reiterated the same view, and in fifty years the statement was accepted as a fact. These authors say that the sailors attached to the fleet of Columbus brought it on his first or second return home in 1493 and 1496. Dr. Good says this is an error, for, on his reaching Seville, in the ensuing month of April, in order to join the Spanish army, syphilis then existed in Auvergne, Lombardy, and various parts of Italy, and in the course of the summer was in Saxony, Brandenburg, Brunswick, Mecklenburg, and especially Strasburg and at Cracow in Poland. Fracastorio, a physician of high repute for his skill in the treatment of this disease, and who resided at the spot where it was thought to have appeared in Spain, asserts that previous to the date here assigned to the disease it existed in Asia and Africa, as well as in some parts of Europe. Fulgori and others state that it was in upper Italy in 1492 and 1493; and at Massa, Cataneo, Pinetor, Burchardi, Capreoli, and at Rome in 1494. Therefore Oviedo's statement that it was carried to Italy by Gonzalvo is an error, as that general only arrived at Calabria May, 1495. Oviedo, although a writer of note, was charged and convicted of falsehoods, contradictions, and

To assume, as many authors have done, that this disease was unknown until after the discovery of

inaccuracies by contemporary writers, such as A. Herrera, De la Casa, Ferdinando Columbus, and others. For this reason, and because he was not a physician, his testimony should be received with caution. That syphilis did not exist in the New World till after the third voyage of Columbus, 1498, is pretty well established, and that it was carried there from the sea-port cities of Spain is probable. Indeed, Swediaur has made these assertions. (See Copeland, vol. 3, p. 1462.) Where and at what time it first appeared is uncertain, but that it did spread, according to all testimony, with great rapidity to all the cities of Europe shortly after the discovery of America, is certain. It was seen as early as 1490 by Fracastorio, and by Fulgori in 1492. It is mentioned in the Mansfield Chronicle, the Leising Chronicle, the Leipsic Annals, and the Zweifalt Annals, as being prevalent in Germany in the summer of 1493. It was common in Auvergne in 1493, in Paris in 1494, and in Augsburg in 1495, in Memmingen, at Nurnberg, and in Edinburgh in 1496, and spread through Bohemia in 1499. (Copeland, vol. 3, p. 1464, says that syphilis is identical with the African "Yaws," which is indigenous among the negro races, thence spreading to the Moors and Jews in North Africa, and thence conveyed into Spain and Portugal ages before its spreading into France and Italy.)

It has been suggested, and with much plausibility, that although the period of the spread of syphilis was associated with the discovery of America, yet it should be more strictly connected with the period of expulsion of the Moors from Spain, of whom, although the bulk retired to Africa, some found refuge in Italy and resided outside the Appian gate at Rome.

Hippocrates speaks of a disease in which there were ulcers on the genitals, general pustules, and loss of the hair, and Celsus speaks of the hard and soft chancre. Chinese literature on this point bears testimony that syphilis existed there and was treated with mercury before the Christian era. Biblical scholars discover in the most ancient of books references to diseases of the genitals and of secondary effects, which, though of course difficult to prove, strongly resemble syphilis. Accounts of some of the symptoms of syphilis are given by Gulielmus de Saliceto as early as 1270; Valescus de Taranta in 1418; Bernardus

America, is ignoring history and prejudges the question. Abundant evidence is to be found throughout the old chronicles and the early general and professional literature of the existence of a disease which it is probable a more exact and enlightened pathology had recognized as syphilis ages before Columbus was born. Indeed, the earliest writers on this disease did not attribute its origin to America. That the sailors and soldiers who made early voyages to the New World lived dissolute lives and were perhaps treated for this disease and died in European hospitals is very probable. But the evidence is entirely wanting that it either existed among the native Indians of North America or in Mexico until after it was introduced from the Old World.*

You are aware of the character of the discussions that have taken place on this subject for nearly four centuries without reaching a conclusion. I shall therefore not attempt to recapitulate those arguments *pro* or *con*, but will present a few facts recently brought to

de Gordonia, who died in 1305; and Joannes ab Arderne in 1360. Stow's Survey of London, vol. 2, page 7, contains a copy of the rules and regulations established by Parliament, in the eighth year of Henry II, 338 years before the voyage of Columbus, in regard to the licensed stews of Southwark, in which is found the following: "No stewholder shall keep any woman who hath the perilous infirmity of burning."

* Those interested in the question of the early history of syphilis will find an admirable chronological list of the earliest publications on this subject in John Astruc's Treatise of Venereal Diseases, 4to. London, 1756. The question of the American origin of syphilis has been well discussed by Clavigero in his third volume of the history of Mexico, Philadelphia edition of 1817.

light and allude to some of the recorded observations of the earliest travelers in America on this subject.

Dr. Joseph Jones, of New Orleans, has endeavored to ascertain, by a microscopical and chemical examination of the bones of the prehistoric races found in the stone mounds of Tennessee and Kentucky, what were the probabilities of syphilis having existed among them. He refers to the fact that John Lawson, the historian of North Carolina, was the first American author to assert that syphilis existed among the Indians of North America prior to the discovery by Columbus.*

* As Lawson's History of North Carolina is not available to many, I will here give his statement in full on this subject: "At these cabins came to visit us the King of the Santee Nation. He brought with him their chief doctor or physician, who was warmly and neatly clad with a matchcoat, made of turkey-feathers, which makes a pretty show, seeming as if it was a garment of the deepest silk shag. This doctor had the misfortune to lose his nose by the pox, which disease the Indians often get by the English traders that use amongst them; not but the natives of America have for many ages (by their own confession) been afflicted with a distemper much like the lues venera, which hath all the symptoms of the pox, being different in this only, for I never could learn that this country distemper, or yawes, is begun or continued with gonorrhœa, yet is attended with nocturnal pains in the limbs, and commonly makes such a progress as to vent part of the matter by bothes, and several ulcers in the body and other parts, oftentimes death ensuing."

"I have known mercurial unguents and remedies work a cure, following the same methods as in the pox. Several white people, but chiefly the Criolos, losing their palates and noses by this devouring vulture. It is epidemical, visiting these parts of America, which is often occasioned through the immoderate drinking of rum, by those that commonly drink water at other times. Cold nights' lodging and bad open houses, and more chiefly, by often wetting the feet, and eating such quantities of pork as they do, which is a gross food, and a

Dr. Brickell, who also resided in North Carolina, and was a contemporary writer with Lawson, in alluding to the existence of the venereal disease among some of the Indian tribes, considers it a by no means settled fact that the disease existed in America prior to the Europeans coming, but states that the Indians were able to cure syphilis by the use of berries, that produced salivation as though mercury had been used.

C. C. Jones says that the Jaouanas were successful in the cure of venereal disease; and Charlevoix, in speaking of it, states that the Indians used a powder of three simples that was an effectual cure of the most inveterate "French disease." Notwithstand-

great propagator of such juices as it often meets withal in human bodies, once tainted with this malady, which may differently (in some respects) act its tragedy, the chances being occasioned by the difference of climates and bodies in Europe. We being well enough assured that the pox had its first rise (known to us) in this New World, it being caught of the Indian women by the Spanish soldiers, who followed Columbus in one of his expeditions to America, who, after their arrival in Old Spain, were hastened to the relief of Naples, at that time besieged by the French. Provisions growing scarce, the useless people were turned out of the city, to lessen the mouths. Amongst these the courtizans were one part, who had frequently embraced the Spaniards, being well fraught with riches by their new discovery. The leager ladies had no sooner lost their Spanish *Dons*, but found themselves entertained by the French, whose camp they traded in, giving the *Monsieurs* as large a share of the pocky spoils within their own lines as the Spaniards had, who took the pains to bring it in their native breeches as far as from America. The large supply of swine's flesh which that army was chiefly victualed withal made it rage. The siege was raised. The French and Spaniards retreating to Flanders, which was a parade of all nations; by which means this filthy distemper crowded itself into most nations of the known world." (Lawson's History of North Carolina, pp. 37, 38, 39; Raleigh edition, 1860.)

ing the scientific method adopted and the seemingly conclusive evidence discovered by Dr. Joseph Jones that syphilis existed among the races that erected stone graves, he, in a review of the whole question, thinks the proofs he has been enabled to present on the subject favor the theory of its existence among the people who built the stone graves.* Should these results be confirmed by other experimentors the ques-

* Dr. Joseph Jones, of New Orleans, has found in the skeletons of the stone-grave race of Tennessee and Kentucky what he regards as unmistakable evidence of syphilis. He says: "The bones in many instances are thoroughly diseased, enlarged, and thickened, with the medullary cavity completely obliterated by the inflammatory action, and the surface eroded; these erosions resemble those of syphilis, attended with the ulceration and destruction of the soft parts during life. The disease was not confined to the tibial shaft; the bones of the cranium, the fibula, ulna, radius, clavicle, sternum, and bones of the face exhibit unmistakable evidence of periostitis, osteitis, endostitis, caries, necrosis, and exostosis. The medullary membrane was involved to an equal degree with the periosteum. Where thin sections of these bones were examined with the naked eye and by the use of magnifying glasses, portions were found resembling cancellous tissue from enlargement and erosions of the Haversian canals and the increase in number and size of the lacunæ, whilst other portions presented the hardened condition known as sclerosis. I observed also various osseous ulcerations which pathologists ascribe to syphilis, rounded ulcers with marked hardening and eburnification of the bone, dependent not only on periosteal deposit, but upon chronic inflammation of the compact tissue itself. That these were not due to mechanical injury, or exposure to cold, is evidenced by the fact that they were almost similar on both sides of the body. Thus, when one tibia was diseased the other was similarly affected, both as to position and nature of the disease. This was true of all the bones throughout, and shows that the poison was introduced through the medium of the blood and was equally distributed to all parts of the body." (*Explorations of the Aboriginal Remains of Tennessee*, p. 66.)

tion of identity of race as well as the age of the graves and their occupants, will require verification before the question can be considered settled.

Loskiel, in speaking of this disease among the Indians, records the fact that when the Indians joined the French against the English in 1676, this disease was then first introduced among them, and for a time they were very unsuccessful in treating it. But observing the methods pursued by the regular surgeons of the army, they gradually acquired knowledge so as to treat it with success. They alleged, said this author, that the disease was introduced by the white man, and had never been known among the Indians before. H. H. Bancroft states that among the Malma people the disease in some of its forms was not unknown to the aboriginals of America. Captain Jonathan Carver says he was aware the theory was held in Europe that syphilis originated in America, but says he could not find the least traces of it among the Nau-dowessies, with whom he resided so long. He further states that he had satisfied himself this disease was unknown among the more western nations, and thinks that it did not have its origin in America, but says the Indian nations who had relations with the Europeans were afflicted with it. Pitcher, a competent medical authority, in speaking of this disease among the Indians, states that they have no specific for its cure, but that the antagonistic properties of *Lobelia syphilitica* makes it the remedy most relied upon by them, though secondary effects are frequently observable after its use. The Indians of Utah, Colorado, New Mexico, and Arizona use a decoction of different

plants and also the lobelia for the cure of syphilis. Carver tells us that the Indians made a decoction from the bark of the roots of the prickly ash for gonorrhœa, which in a short time effected a radical cure.*

Want of time prevents my alluding to other diseases that have seriously afflicted the Indians. One word, however, on small-pox, a malady that perhaps has been the most destructive with which they have been afflicted. Undoubtedly it was brought by the early explorers. The Indian treatment of this disease is particularly injudicious, their sweat and plunge bath being equally obnoxious and leading to fatal consequences. It is justly held that their ignorance of a disease and want of success in treatment argues its recent introduction.

Humboldt, in his political essay on the History of New Spain, gave careful attention to the question of the diseases that probably diminished the population and perhaps destroyed the Toltec race in Mexico, and more than suggests, almost proves, that they were

* The professional literature on this subject is very large and familiar. The following historical works can be consulted to advantage in a study of this question: Clavigero's History of Mexico, Vol. III, pp. 415 to 435; H. H. Bancroft, *Uncivilized Races of America*, Vol. II, p. 594; Jonathan Carver, p. 259; John Lawson's History of North Carolina, pp. 36, 39, etc.; Joseph Jones, *Exploration of Aboriginal Remains of Tennessee*, pp. 66, etc.; G. H. Loskiel, *Mission of United Brethren Among the Indians of North America*, pp. 108, 112; Zina Pitcher in Schoolcraft's History of the Indians, Vol. IV, p. 505; John Brickell, M. D., *Natural History of North Carolina*, pp. 397, etc.; William Robertson's History of America, Vol. II, pp. 85, 397; Dr. Benjamin Rush, *Natural History of Medicine among the Indians*, C. C. Jones, *Antiquities of Southern Indians*, p. 33; John D. Hunter, *Manners and Customs of Indians*.

related to yellow fever. Prior to the white man's successful settlements in America, the Indians had, it is believed, greatly diminished in number along the Atlantic coast and in the Southern and Gulf States.

I have run through much of the literature bearing upon the history of the Indians, as well as travels and explorations of our country, and made many extracts and notes on the state of medicine among them in the preparation of this address, but which I have not been able to use or even refer to. That the labor may not be entirely useless, I append as a note a list of some of the works which may assist those who desire to refer to the medicine and surgery of the North American Indians.*

* When making excerpts and references to authorities consulted on matters relating to medicine and medical practitioners among the North American Indians, I had at first no thought of preserving, much less of publishing, the list. Its compilation is, therefore, an after-thought, that came to me when many of the slips and marks had been removed from the books and thrown into the waste-basket. Many works, too, were consulted of which no formal note was taken or slip placed to indicate the place or fact. This I regret; but those given may serve as a beginning to a Bibliography of Medicine among the American Indians.

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American Antiquarian Society Transactions, p. 283.

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I am persuaded that those of us who traversed the continent in 1871 have been deeply impressed with

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 Folsom, George. *Dispatches of Hernandez Cortes,* p. 199.
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its vastness. Nor can we contemplate its grandeur without having presented to the mental vision con-

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Lewis and Clarke's Expedition. Vol I, pp. 164, 297, 416; Vol. II, p. 237.

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Lubbock, Sir John. Prehistoric Times, p. 256.

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Oviedo y Valdes, Gonzalo Fernandez de.

vincing evidences of its great age, as well as of the very remote antiquity of man upon it. Who can estimate the centuries that have passed since this globe has been in a condition to support animal life, and especially man? And how inconceivable to us are the millions of human beings that have been

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born, lived and died upon it before the discovery of Columbus! All must grant there was a first family. Race may have succeeded race and nation succeeded unto nation, and yet have left few traces of their existence. And although none of these people may have possessed the intellectual development and arts known to those of ancient history, nevertheless they were human, endowed with human hearts and human sympathies, and in a degree susceptible to most of the joys and sorrows, as well as to the bodily ills, inherited by man in all conditions of life.

You may consider the problem of the cosmogony of the universe and the genesis of man according to your several predilections, or as you have studied the question. I have simply attempted in a popular manner to outline the subject as it has presented itself to my mind. As physicians you can speculate as to the possible origin of medicine among savage and uncultured people. You can picture to yourselves a world of but a few thousand years old or one of immense antiquity, and a sparse or a considerable population. That the early races in North America were subject to sickness, accidents, and death, is beyond question. That human sympathy attempted to relieve them by some means I believe all will concede. What degree of skill we should accord to these primitive physicians and surgeons is uncertain. That efforts were actually made by recognized physicians to the end of obtaining relief and cure cannot be doubted. This study remains but deserves to be made. The meager outline of Indian medical practice which I have presented, I am conscious falls far short of doing justice to the race.

In conclusion, gentlemen, though I have many apologies to offer for the manner in which I have treated this subject, I hope I need make but few for the theme of my remarks. The physician, from the duties and requirements of his office, is prone to induction and to the discovery of new facts, to compare them with old theories, and by comparison arrive at correct conclusions. Naturally, the physician is attracted to the master-works of the Creator, of which man is the crowning part. Therefore, an investigation of his early history and habits on this globe, and particularly those of the prehistoric man of our own continent, seemed not inappropriate for this occasion. Many deductions may be drawn from the facts I have endeavored to present. I shall, however, make but one, which is connected with our profession: Everywhere and in every age, among all tribes and peoples, whether the most savage or the most highly civilized, may be traced the presence of the physician. He was ever deemed a necessity, and his standing and influence have everywhere been commensurate with his high and honorable office, which won for him in the Apostolic age the appellation of the "Beloved Physician."

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