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ARTICLE V.

PRIMITIVE MAN IN AMERICA.

BY PROFESSOR D. S. MARTIN, OF NEW YORK CITY.

FEW questions of a purely scientific character have awakened so great and general interest as that of the Antiquity of Man on our globe. It is but a few years since the long-accepted chronology, based upon the interpretation of the Scripture narrative, was all but universally received. Nor was it until several distinct lines of scientific investigation were found to be apparently converging toward the same result, that there has been any strong disposition to accept the idea that our familiar chronology is perhaps inadequate for the facts of science, and based on some misconception of the biblical record. I am speaking here, of course, not of the irreligious and unbelieving class of thinkers, but of the great body of more or less educated Christian people, who accept and revere the Holy Scriptures as the inspired word of the God alike of nature and of grace. To such persons, all questions of this kind have a more than speculative interest; they awaken painful perplexity and serious concern about themes of gravest importance; and it is doubtless from this cause, quite as much as from its intrinsic scientific interest, that the whole subject of Prehistoric Archæology has risen into such prominence and entered so widely into the thought of our day.

These discussions, moreover, introduce us into a shadowy and mysterious border-land, lying between the early records and traditions of mankind, on the one hand, and the great periods of physical and climatic change that belong to the domain of geology, on the other. Many remarkable suggestions and curious inquiries begin to

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present themselves to the mind. What was the primeval status of human society? Under what outward conditions of life did our earliest ancestors find themselves? Was man an eye-witness of any of those grand phenomena of ice and flood that marked the glacial age; and was he contemporary with those gigantic and abounding animal forms that are only known to us in this later day by their buried and scattered bones? These, and many similar problems, give great interest and fascination to the whole subject, in itself considered; and it is not surprising that the recent discoveries and discussions, apart from any of their higher bearings, should have taken a strong hold on the popular mind.

The purpose of this present article, however, is not at all to enter into a general consideration of the antiquity of man, or of the facts of prehistoric archaeology, but simply to set before the reader some of the latest and most interesting discoveries that lie nearest to us in the older states of North America. To do this intelligently, however, it is needful to give a summary, in the briefest form, of the leading facts of the science.

I. Of the Glacial Period in Geology.

All students of the earth's physical history, with scarce an exception, are agreed as to the general fact,—first brought forward by Agassiz, further developed by Guyot, and since then followed out and worked up with great fulness of observation by many men in many lands,—that the last great stage in the changes through which our globe has passed before reaching its present condition, was that of an epoch of cold climate over the North Temperate Zone,—a prevalence of arctic conditions far south of their present limits. The facts may be conceived of thus:—a long period during which there was a slow and gradual southward extension of the region of polar cold, and consequently of polar snows, accompanied, and in part

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caused, by an elevation of the northern lands. The necessary result of these events would be, as it is now on all snow-clad mountains, that the ever-accumulating snow and ice would form glaciers, first on all the higher lands, extending downward to the lower levels; and then, as is the case in Greenland or Spitzbergen, that these ice-streams must coalesce, fill up the larger valleys to a vast thickness, form a general mantle of ice over the entire country, and spread themselves thus in ceaseless and resistless extension, until they reach either the sea, as now on arctic and antarctic shores, or a region mild enough to thaw the ice-mass at a rate equal to its advance. In the former case, the end of the glacier that reaches the sea is gradually broken away to form icebergs; in the latter case, the line at which the rate of progress is equalled by the rate of melting, is marked by an accumulation of earth and stones, irregularly piled together, which is called a "terminal moraine." All modern glaciers that do not reach the sea form these moraines or embankments at their lower ends. The ice, moving with enormous pressure over and between the rocky bed and sides of its channel or valley, grinds and breaks and scrapes away fragments, large and small, of the rock of the region; these become embedded in the mass, and are of course carried onward with its advance, and finally accumulated at its termination. In their enforced journey, however, they leave enduring traces of their presence: all those that reach the bottom of the glacier are of course held under extreme pressure; and, like the grains of emery in the leaden wheel of the lapidary, these ice-embedded stones smooth and polish and grind and furrow the bed over which they are moved. The traces of an ancient glacier, therefore, are perfectly characteristic and unmistakable: the grooved and polished surface of its bed, and the irregularly heaped-up ridge of its terminal moraine, are as clear and convincing to the eye of a geologist, as the foot-print on the sand was to Robinson Crusoe.

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The fact is conspicuous that the whole of eastern North America, down to about latitude 40°, is thus ice-worn wherever the rock is favorably situated to show and to retain these markings; and the line of the "Great Terminal Moraine" has now been traced, by the independent labors of several observers, from the Atlantic coast across the country, over mountains and valleys and prairies, at least as far as Minnesota. On the other side of the Atlantic the facts are equally clear and conspicuous, save that there the limit of drift and of ice-markings does not reach as far southward as here by several degrees,—a fact which corresponds substantially with the present relative difference in climate between the two sides of the Atlantic.

But in Europe a further series of facts has been recognized, of an important kind; viz., the indications of two periods of cold climate, separated by a milder interval. The first of these glacial epochs was evidently much more severe and protracted than the second: it was characterized by a great "continental ice-sheet," moving in a general southerly course across northern Europe and the British Isles, and spreading its mantle of drift material and leaving its scratched and polished markings all over the region. The second was a period of sub-arctic conditions, when the ice action was not on this broad continental scale, but rather consisted in a great extension of the present glacier-systems of Scandinavia and the Alps, and the formation of others on all high elevations. In other words, this second cold period was not so prolonged as to go on to the union of these local glaciers, and the production of an ice-sheet covering the whole country.

Between these two glacial epochs, we have evidence of a time of lower level, of mild temperature, and of abundant animal life. This has been termed the "inter-glacial" period. It has been fully recognized abroad, but not until lately has it been definitely traced out in this country.

Of course, on the passing away of any such period of long-continued and wide-spread cold and snow, there

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must be inevitably just such phenomena as we see every year at the breaking-up of winter,—a prevalence, over the whole region affected, of floods and freshets,—only on a scale proportioned to the extent and duration of the covering of ice and snow. Without going into details, it is enough to say that, overlying the drift and the scratches of the glacial period, we have abundant deposits of clays, sand, rolled stones, etc., all bearing clearly the marks of transportation and deposit by flowing water. These, moreover, extend far south of the limits of the ice-sheet, as marked by the great moraine, and may be traced through all our valleys and water-courses till they reach and join the deposits of the sea-shore. During all this long melting-time of the glacial ice, our little streams were torrents and our rivers were floods; and thus a vast amount of transportation and deposit of material, and of valley-excavation, was performed by streams that now are but the shrunken remnants of what once they were.

II. Of Primeval Man in Europe.

There are few persons who have not seen the stone arrow-heads and other such implements wrought by our Indians, and now found here and there over the surface of this country. Any museum of antiquities will show many and varied forms of these weapons, and numerous other articles of ornament or use, fashioned from like materials, with varying degrees of skill and neatness. Of the human origin of such utensils, no one in his senses can doubt. Moreover, where savage tribes still dwell, here or in other lands, such articles are now manufactured, and the methods may be seen and studied.

The fact was at first strange and startling, that all over Europe, so long the seat of civilization, are to be found similar stone implements,—axes, spear-heads, arrow-points, etc.,—belonging evidently to a very remote antiquity. But the fact is more remarkable, when we find that these ancient

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relics go back to a time closely associated with the later portions of the age of glacial cold.

The study of the stone implements of Europe soon showed that two types, or series, of them exist, belonging to two distinct periods. Those of the earlier type are roughly chipped or broken into shape; those of the later type are wrought with more care and skill, and are often elegantly polished. These last are associated with bones of domestic animals, fragments of pottery, and evidences of some pursuit of agriculture: they belong, therefore, to a later period, and are not in any proper sense vestiges of "Primeval Man." We will therefore dismiss these "Neolithic" remains, as they are called, and turn briefly to the older, or "Palaeolithic," implements.

These rougher and earlier traces of human handiwork are again found to belong to two groups and two periods. The most rudely made and ancient are found chiefly in caverns, buried under a floor of stalagmite formed by the lime-dripping of ages, and associated with the bones of animals long extinct,—the mammoth or furry elephant, the European rhinoceros, the great cave-bear, the cave-hyena, etc., etc. Those of the other series, less rude in workmanship, are found associated with the bones of animals now confined either to sub-arctic latitudes or to high elevations, as the reindeer, musk-ox, marmot, etc. To sum up the results of careful investigation, it is pretty clearly and generally recognized that in these last we have the relics of man in Europe during the second, or less severe, glacial time, when he lived in much such fashion as the Eskimo people do now, hunting the musk-ox and reindeer, and using only implements of stone or bone. With the passing away of this period of cold, the arctic animals gradually followed the retreating ice toward the north; and so did also, to all appearance, the human tribes that hunted and lived upon them. Whether this was by preference, or due to the hostile incursions of other peoples from the south and east, we cannot attempt

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to say. The latter seems the more probable view. But the fact remains, that the Eskimos of the far north, and the tribes of Siberia and Lapland, illustrate to us a phase and stage of life that is a close approximation to that of the dwellers in Central Europe in the second glacial period, if it be not indeed a direct continuation thereof.

III. Of Primeval Man in America.

On this continent, the "Stone Age" has lasted far later than in Europe; and, indeed, it is still in full existence among the Indian tribes, wherever civilized weapons have not yet become familiar. But how far does it run back into the past? The Indian proper is perhaps but a late comer, crossing over from Asia, at or near Behring's Straits, within a few centuries only, and overrunning the country southward and eastward, sweeping away a wide-spread race of milder and more civilized type, whose mounds, mines, and burial-places alone remain to attest their existence. It is probable, indeed, that a good deal of the south-western semi-civilized life of the Arizona and New Mexico tribes is a remnant of this earlier condition; and that its fullest development was seen and destroyed by the Spanish "conquistadores" in Central America and Mexico. Nay, more: it would seem as though the Indians that inhabited New England two or three centuries ago had not then occupied it so very long; for the natives of that region encountered by the Northmen in their visits to our coast in the eleventh and twelfth centuries are described in such wise as to indicate rather an Eskimo than an Indian race.

But be this as it may, the question most germane to our subject is, what are the earliest human traces in North America, and how far, if at all, do they lead back to the ice-period of geology? It is a matter of great interest, that much the fullest study, and much the clearest evidence, on these points, relate to a district near to the very centres of our metropolitan modern life.

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At the point on the Delaware river where the city of Trenton stands, there exists a wide and thick deposit of a peculiar dark-colored river-gravel, covering an area of several square miles, and attaining a thickness of sometimes fifty feet. It forms the gravel islands in the stream, and the bluffs along the banks; and it is readily and sharply distinguished from the "yellow gravel," a marine deposit of much greater age, that covers most of the adjacent region, especially to the eastward. This dark-colored river-gravel bears all the marks by which geologists recognize the deposit of a strong flow of fresh water, and evidently goes back to a time when the present Delaware rolled seaward with a mighty current, and here spread out, at a wider portion of the valley, into a broad expanse of several miles across.

This deposit, moreover, is of comparatively recent age, as none has been formed since, except the modern mud of the existing Delaware.

It is impossible not to connect this gravel, and the state of things that it reveals, with the melting-period of the glacial ice, as previously described in this paper.

The peculiar interest of these matters, however, lies in the fact that in this river-flood gravel are found the first well-defined and assured traces of the presence of man.

The discovery and determination of these human relics we owe to the enthusiasm, patience, and diligence of one solitary worker in science, Dr. C. C. Abbott, of Trenton. It has frequently happened that the most interesting and fruitful discoveries in the progress of knowledge have been made by just such disinterested and isolated lovers of nature and of truth, whose labors have been too often but little known or appreciated in the communities where they have dwelt.

Dr. Abbott had long collected the Indian implements which abound in the surface soil of the region near Trenton, and are washed out by rains or turned up by the plow. Becoming interested in the writings of Sir John

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Lubbock on primitive man, he entered into correspondence with that gentleman, and sent him numerous specimens of the Trenton relics. Naturally, this exchange of thought led to closer study and increasing interest in the whole subject; and it was not long ere both gentlemen observed and remarked upon the occurrence of two distinct types of implements among those collected. The one type was that of the familiar "Indian arrow-heads," made with considerable skill and neatness, of quartz or hornstone (a variety of quartz resembling flint). The other type was entirely distinct: the implements were larger, much ruder in make, and consisted of a dark argillite, or hardened clay-slate. Dr. Abbott now began to seek particularly for these latter implements, which were much rarer than the others; and soon found that they occurred only on the river-banks, and had apparently been washed out of the gravel bluffs. The fields and farms of the neighborhood yielded plenty of the ordinary Indian relics, but none of these ruder, and, as it now appeared, far earlier ones. The two kinds were never found together.

On the strength of these *data*, Dr. Abbott published a notice in some of the scientific journals, claiming the discovery of human implements in this gravel of the glacial age. So remarkable a suggestion did not, however, go unchallenged. At once the demand was made for positive proof. It was required that the implements be found, not merely at the foot of the bank, and presumably washed out of the bluff, but *in situ*, embedded in the gravel. It was not long before the Doctor was enabled to meet this demand with triumphant success: the implements were found in the bluff itself, projecting from its face at depths of several feet below the general surface of the country. Moreover, as if to aid the zealous and laborious student, the Pennsylvania Railway Company now began a great series of cuttings through this same gravel, half a mile or so away from the river. Here, of course, perfectly fresh and un-

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disturbed sections of the beds were laid open day by day, and a rich field of study opened under the most favorable conditions possible. Happily, the man and the opportunity were thus brought together.

The result of long and constant search has been to render the facts abundantly clear that these ancient river-gravels, wherever accessible, contain human implements, and that these are always of one particular type,— rudely wrought from the dark-gray argillite,— while they never contain the neater workmanship, in quartz and hornstone, that the Indian tribes have left scattered through the surface soil. More recently, Dr. Abbott has obtained a human jaw-bone in the gravels. Man then, in a rude stage of advancement, lived by hunting and fishing on the banks and in the waters of the Delaware, when that stream was swelled far beyond its present limits, and when it covered a large part of its modern banks with a broad, deep flood derived from the melting of glacial ice.

This seems to carry the presence of man back to a very remote period. Although the glacial age is geologically recent, it is chronologically far away: computations are attempted, indeed; but we lack any satisfactory *data* for them as yet; and they vary from thousands even to hundreds of thousands of years. Has man been thus long in America?

To meet this last question, another series of observations, entirely independent from those of Dr. Abbott, has now come in to supplement his work. Professor Henry Carvill Lewis, a young but very accomplished geologist of Philadelphia, was attached to the Pennsylvania Geological Survey as one of the scientific corps of assistants, and took charge of the surface geology of the region along the Delaware. It is to Professor Lewis (assisted by Professor G. F. Wright) that we owe, in great part, the beautiful and careful work done in tracing and mapping the "Great Terminal Moraine" of the continental ice-sheet, across the entire breadth of the State of Pennsyl-

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vania, from the New Jersey to the Ohio line. He has been a specialist in the department of glacial geology.

The outcome of Mr. Lewis's work along the Delaware has been to show the true age and relations of this dark Trenton gravel, and to prove that it represents, not the flood-time of the earlier and greater ice-period, but that of the second or minor one. This distinction, as above stated, has long been recognized abroad, but not until recently in North America. Professor Lewis's evidence is of this kind; viz.—

Somewhat lower down the Delaware there occurs a great deposit of fresh-water clays and gravels, largely developed in the region about Philadelphia, and unquestionably, both from position and structure, the product of the first or greater post-glacial floods. This is the clay of which the Philadelphia brick is made. Now the Trenton gravel, which is quite different and easily distinguished, is found, when followed down the river, to be a later deposit, laid down in the channel cut by the river through these earlier brick-clays and red gravels of Philadelphia. The particular reasons why these deposits are thus somewhat irregularly distributed along the valley, are discussed by Professor Lewis in a brief but admirable series of papers on the "Geology of the neighborhood of Philadelphia," and on "The Trenton Gravels and their Relation to the Antiquity of Man." But the evidence is clear and ample.

For this second glacial era, which has been designated as the "Reindeer Period" abroad, Mr. Lewis proposes the term "Eskimo Period,"—suggesting that the name should be given from the highest form of life, and that the evidence shows that the primitive dwellers along the Delaware valley, like the early men abroad, as above remarked, were so closely related in their condition and mode of life to the existing Eskimo race, that it is strongly probable that the latter are but the migrated descendants of the former.

On this point, many interesting *data* have been recently

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gathered together and presented by Professor A. S. Packard in the *American Naturalist* for May and June, 1885, "On the Labrador Eskimo and their former range Southward." It is here shown very clearly that we can trace this arctic people to the Straits of Belle Isle, and even to some extent across into Newfoundland, within the past century, or but little more, and that this region has many traditions and vestiges of their conflicts with the Indian tribes. It appears, moreover, that the branch of the Eskimo that inhabit Greenland entered it from Northern Labrador, and that they seem to have migrated northward along the coast islands, and finally crossed Davis' Strait, under a constant *vis a tergo* from the hostile tribes of the south and west, at no very ancient day. All these indications favor the view that they may well have occupied large districts of eastern North America at a remoter period.

It will be seen from the foregoing sketch that man's record in eastern America hardly runs back as far as it has been traced abroad. These Trenton relics carry us to a very well-defined period,—the close of the second glacial epoch. In Europe, on the other hand, evidences of human occupancy and handicraft are found not only in the corresponding "Reindeer period," but further back still, as above stated, in the "inter-glacial" time, when a milder climate prevailed, and an abounding animal life existed, that is now largely if not wholly extinct. Of any thing like this there is as yet no proof in eastern North America. Some geologists, indeed, lay claim to indications of a far earlier presence of man,—even before the "Great Ice Age," back in the later beds of the Tertiary time. Such is the celebrated and much-disputed "Whitney skull," which is said to have been found at a great depth in the gold-bearing gravel of California. But we need stronger evidence, and much more of it, before these views can be generally received.

The latest announcement of this kind is that of a "fos-

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sil man," found in a hard travertine bed (deposited from hot calcerous springs) on the shores of Lake Tezcoco, near the city of Mexico. The bed has been disturbed and broken up by an extrusion of volcanic rock, of which there exists no tradition. But as similar beds in the neighborhood contain fossils of Quaternary age (equivalent to our glacial and interglacial periods of the North), and as the teeth show certain peculiar features already noted in ancient Toltec graves, there is nothing here to indicate any greater antiquity than is already proved in the case of human remains of the interglacial time in Europe, or, perhaps, than those of the Delaware valley.

Since Dr. Abbott's discoveries have been published, however, a lady in the West, Miss Franc E. Babbitt, has found similar facts in the later glacial beds of Minnesota. The specimens consist of a large number of very rudely "flaked" implements of various shapes and sizes, made of white quartz, and lying in a single stratum or layer in the "bluff deposit" of the Mississippi river. This is recognized by the best authorities as representing, like the Delaware gravel, the flood-time following the latest ice-period. The peculiar feature of these specimens, however, is that they are not scattered through the deposit, as though lost in the hunting and fishing of many generations of savages, which is the case at Trenton; but they lie as originally placed by the hands of makers or owners, carefully assorted in little heaps and groups,—those of one shape and kind together,—the whole evidently forming a sort of *cache*, or perhaps the primitive stock-in-trade of some early worker in quartz. This, of course, proves that they were laid upon dry ground; and that then they were slowly and gently covered by the gradual rise of the river, then buried in its fine mud, and lastly overlaid by the main deposit of the second glacial flood. The makers, therefore, lived prior to or early in this second glacial time; and it may be that they correspond most nearly in

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date with the interglacial tribes of Europe,—the earliest yet traced.

The papers published by Miss Babbitt are exceedingly interesting (*American Naturalist*, June and July, 1884), and show great care and perseverance in study, and skilful command of her subject as a writer.

In closing this brief outline of the present state of the question concerning the antiquity of man upon this continent, a few words may not be amiss as to the bearings of the whole inquiry upon the received views of the time of man's presence on the globe. One fact is clear,—that both here and in Europe races and tribes that lived and wrought as many savages do now, witnessed the whole second period, at least, of the Great Ice Age. We can well believe, as Professor Carvill Lewis argues, that the closing portion of these events may not have been so vastly remote in time as many geologists are wont to think. *Omne ignotum pro antiquo*, is a saying that has had many illustrations. But, nevertheless, it is hard to believe that the interglacial epoch, however we may abridge the estimates, was not a good many thousands of years ago. What shall we do with the scriptural chronology? is a question that troubles many earnest minds.

To attempt any thing like an answer to this grave inquiry would require more space than the limits of the present article permit. But a few suggestions may be made, with a view to relieve some perplexed and anxious thinkers. We may note, first, the virtue and the necessity of patience, in the presence of unsolved problems. Because two aspects of a subject do not seem to us to agree, it does not follow that no agreement is possible: and the person who despairs in the presence of such difficulties is like the schoolboy who cries over the "sum" in arithmetic that he cannot at once perform. Every department of human life and experience and study is full of unsolved problems and apparent contradictions, which in time will and do resolve themselves to him who will "learn to labor

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and to wait." Let no man loose his hold, therefore, on any important aspect of truth, because he cannot see how to adjust it to another truth.

Again, it is far from certain that we have rightly read or rightly interpreted the early biblical chronology. As the "days" of Genesis i. have expanded before more careful study into a figure for grand creative periods, so it may be that, hidden under the apparently simple wording of the ancient record, there lies a deeper meaning and a wider sweep than we have been able yet to recognize, in reference to the duration of the early human periods. Nor yet is it certain, to go a step farther, that the prehistoric and glacial stone-workers were indeed of our own race. There is nothing in either nature or Scripture to prevent our conceiving of tribes of beings as occupying our globe for ages before the present moral and spiritual dispensation commenced. Man, as we know him, began with a creature capable of receiving a divine revelation and of obeying or violating a divine command. Herein is the distinguishing feature of our humanity, herein its glory and its peril. That in the long and slow evolution-process other races may have preceded ours, living under another and lower dispensation, is an idea neither impossible nor absurd. There is much, indeed, to suggest it. With them, however, we have naught to do, in any of those moral and spiritual relations which it is the function of Scripture to reveal and enforce: they are to us only a subject of geological and speculative interest. Least of all, need their poor bygone relics cause any man of the present race to question the divine revelation, to lose faith in the great spiritual realities, or to doubt the "promise and potency of life" set before the righteous and the redeemed.

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