

lower carboniferous rocks, and at about a mile from the medicinal spring is situated the "salt mountain," supposed to be so called from a salt spring which issues from it. H. Gesner, Esq., informs me that this spring is not strongly saline. I learn from Dr. Honeyman that there is in this district another spring of a highly gaseous character, which is continually sending off bubbles of gas, carrying up a fine sand; its water is not saline but sweet to the taste.

Brine Spring, 12 miles from Bedeque. H. Gesner, Esq., informs me that a very strong brine, affording one bushel of salt to the hundred gallons of water, or six per cent. of salt, is found on the north side of the St. Patrick's Channel.

From what we see of the number and distribution of the brine springs of the Province, mentioned in this paper and elsewhere, the manufacture of salt may be expected to become a considerable branch of industry. The composition of the brines issuing from the lower carboniferous rocks is favourable to the manufacture, if, as may be supposed, they all resemble those of which the analysis has just been given, in containing sulphate of lime as the most abundant ingredient next to salt. As this is a substance not readily dissolved by water, it will separate almost entirely from the brine on boiling down to a certain stage, and the deposit on further evaporation will be table salt of considerable purity. Bromine of course, if present, will be found in the fluid from which the salt has deposited.

ART. IX. ENQUIRY INTO THE ANTIQUITY OF MAN.

BY WM. GOSSIP.

[*Read March 6, 1865.*]

THE evidence relied on by geologists who endeavor to carry back the antiquity of man to an era far beyond the historic, is gathered from strata of the tertiary period, in which, associated with remains of extinct animals, are flint implements and weapons, similar to those which are known to be of the recent period; and from cavern deposits, in which the remains of man are found, mingled with those of other animals, the species of which it is supposed did not come down to the chronologic or historic age.

Geology, however, reveals no data to establish positive conclu-

sions on this subject. There is ample room for speculation, and time and verge for almost every deduction that may be hazarded, and many of these are practically mischievous. It has already become a vexed question whether man was really created, or progressively developed from inferior forms of animal existence. Some philosophers evidently deem the record of his creation a fable. Others, among whom we may quote Sir Charles Lyell, attempt to show that man went back to, if I may so speak, or was coeval with the extinct animals, instead of their coming down to what we believe to have been his era; or they would lead us far beyond the sacred chronology to a period anterior to the glacial, and showing us vegetation similar to that which now prevails in temperate regions of the earth, and remains of quadrupeds which once lived and flourished upon it, bid us seek there, as if seeking we should find, for evidence of man's existence also. None, however, has been or is likely to be discovered. Nor does it seem probable, as the result of investigation, that the truth of the sacred record will ever be successfully disturbed.

It is to a few of these speculations, and the alleged proofs, which may be found at large in Sir Chas. Lyell's book "*On the Antiquity of Man*," that I would this evening direct your attention. I shall endeavour to show that the facts stated as evidence of human existence are not referable to the remoter period, but may all have been consummated in the chronologic era.

It is something gained in a cause like this, when the bias with which an author approaches his subject can be clearly demonstrated. If he truly believe that he can achieve a result, however distant it may seem, he will seldom hesitate to adopt every possible inference which he thinks may lead to it. Sir Charles Lyell has largely, whether justifiably or not, drawn upon the material at his command, for the purpose of making a nearer approach to his object. It would occupy too much of our time were I to allude to every instance; but I will quote one, which if it open up an extensive field of investigation, is well calculated to strengthen scepticism, and to lead astray from the legitimate area of enquiry, which as yet is far from being thoroughly explored.

There are in England two sets of strata, of marine formation, which seem to form a connecting link of the tertiary with the post-

tertiary periods. One of these belongs to the older pliocene, and is divisible into the coralline and the red crag—the coralline being the older of the two. The other belongs to the newer pliocene, more advanced in time as the term indicates, and is commonly called the Norwich, and sometimes the mammaliferous crag. I need not go into a lengthy and particular description of these formations, any one who desires that will find it in Sir Charles Lyell's "*Antiquity of Man*," and other works on Geology. It will suffice to state, that in them are a number of shells of recent species, the proportion of the recent to the extinct being greater in the newer beds. Thus, in the coralline or oldest crag, there is found fifty-one per cent of recent, in the red crag fifty-seven, and in the Norwich crag eighty-seven. These shells prove a progressive change in the climate. That of the coralline must have been warm, for twenty-seven southern shells are found, of species which now inhabit the Mediterranean and West Indies, and but two closely related to arctic fauna. Only thirteen of these southern shells occur in the red crag, together with three new southern species, but eight northern species are found, showing that the climate was less fitted to support some of the testacea that lived in the previous period, and becoming more suitable for the northern species. All the foregoing southern species disappear from the Norwich crag, but all the eight northern species remain, and four arctic shells are added. Thus is represented the increasing cold, the gradual approach to the glacial period of depression, although, in the time of the Norwich crag, probably there was no season in which the cold was intense.

Connected with the marine deposit of the Norwich crag, at a place called Cromer Jetty, where it thins out, is a submerged forest, which has been traced for more than forty miles, and which at one time must have had a considerable elevation above the sea. The Scotch fir, spruce fir, yew, alder and oak, are among the trees that are known to have grown in that region, and various extinct mammalia flourished there, of which numerous bones have been collected.

There is no doubt about the age of these respective formations. They belong most certainly to the older and newer pliocene strata, and the associated fauna are those which previously and probably

then existed, and roamed the forest now buried beneath the waters. But had remains of man been found there, the chronological record would not have been true. They have not been found, therefore positive evidence against that record is wanting, and so far the negative evidence proves its truth. Yet Sir Charles Lyell writes, with reference to the time of the Norwich crag:—

“Neither need we *despair** of one day meeting with the signs of man’s existence in the forest bed, or in the next overlying strata, on the ground of any uncongeniality in the climate, or incongruity in the state of the animate creation with the well-being of our species. For the present we must be *content to wait*, and consider that we have made no investigations which entitle us to wonder that the bones or stone weapons *of the era of the *elephas meridionalis** have failed to come to light. If any such lie hid in those strata, and should hereafter be revealed to us, *they would carry back the antiquity of man to a distance of time probably more than twice as great as that which separates our era from that of the most ancient of the tool-bearing gravels yet discovered in Picardy or elsewhere.* But even then the reader will perceive that the age of man, though pre-glacial, would be so modern in the great geological calendar, that he would scarcely date so far back as the commencement of the post-pliocene period.”

From this instance, which will show the scepticism, or if you will the positive belief, of the talented new school of geologic philosophy, you will gather the fact, that there are no evidences of man’s existence upon the earth, in any formation or deposit, previous to the glacial period, nor have any traces of his existence that may be depended on been discovered in Europe until a long time after its close.

When scepticism is carried beyond the historical, chronological, and geological evidence, it need not surprise, that conclusions based on such scepticism are disputed. Sir Charles Lyell states in his book, that M. Desnoyers, an observer equally well versed in geology and archæology, had disputed the conclusion arrived at by other geologists (M. Tournal and Christol), that the fossil rhinoceros, hyena, bear, and other lost species, had once been inhabitants of France contemporaneously with man. “The flint hatchets and arrow-heads,” he said, “and the pointed bones and coarse pottery of many French and English caves, agree precisely in character with those found in the tumuli and under the dolmens (rude altars of unhewn stone) of the primitive inhabitants of Gaul, Britain, and Germany. The human bones, therefore, in the caves, which are

* The italics are mine.—W. G.

associated with such fabricated objects, must belong, not to antediluvian periods, but to a people in the same stage of civilization as those who constructed the tumuli and altars." "In the Gaulish monuments," he added, "we find, together with the objects of industry above mentioned, the bones of wild and domestic animals, of species now inhabiting Europe, particularly of deer, sheep, wild boars, dogs, horses and oxen. This fact has been ascertained in Quercy and other provinces, and it is supposed by antiquarians that the animals in question were placed beneath the Celtic altars in memory of the sacrifices offered to the Gaulish divinity Hæsus, and in the tombs to commemorate funeral repasts, and also from a superstition prevalent among savage nations, which induces them to lay up provisions for the *manes* of the dead in a future life. But in none of these ancient monuments have any bones been found of the elephant, rhinoceros, hyena, tiger, and other quadrupeds, such as are found in caves, which might certainly have been expected had these species continued to flourish at the time that this part of Gaul was inhabited by man."

I quote this, not only to show that there is a wide difference of opinion among geologists of eminence upon the antiquity of human remains, but that Sir Charles himself, as he states further on, became of opinion, from the arguments of M. Desnoyers and the writings of Dr. Buckland on the same subject, and by visiting several caves in Germany, that the human bones mixed with those of extinct animals in osseous breccias and cavern mud in different parts of Europe, were probably not coeval.

This opinion, however, he limits, for he again states, "But of late years we have obtained *convincing proofs*, as we shall see in the sequel, that the mammoth, and many other extinct mammalian species very common in caves, occur also in undisturbed alluvium, imbedded in such a manner with works of art, as to leave no room to doubt that man and the mammoth coexisted." I am not inclined to dispute their coexistence, but I wish to offer my reasons for believing that it took place in the chronologic era, and not in time so far beyond it as to make the Bible a fable, and to scatter the foundation of our religious belief to the winds.

In the way that I am able to understand the geological evidence on the subject, it does not conflict with the sacred chronology, and

may be readily made to prove its truth; while all the argument adduced in favor of the remoter antiquity of man, if valid, must prove that chronology to be a falsehood. My ideas upon the subject tally more with those of M. Desnoyers than with Sir Charles Lyell's, although distinct from either. I acknowledge the truth as advanced in part by the former, but dissent altogether from the conclusions of the latter. At the same time, my solicitude is not on account of my own views, but lest those of Sir Charles Lyell should have more importance than they deserve. You know what he means—that he thinks he has good evidence in strata in which the remains of man are found with those of extinct species of animals, to prove not only the age of such strata, but also the coeval existence of man and the extinctions with which he there seems to be associated, and that man's proper time on this planet will thus be tens of thousands of years (it does not matter how many) further back than his first appearance in the Garden of Eden. I believe that in all this he is mistaken—that he takes things too much as he finds them, for the purpose of establishing a foregone conclusion, and attaches too little importance to the changes that have taken place on the earth during the past six thousand years. He ignores altogether such an event as the Noachian deluge, and the phenomena which must have accompanied and followed it. He does not allude to it, and his silence is more eloquent than words to show that he does not believe in it. I do believe in it, and depend upon it as strong evidence in disproof, and to uphold my own views, although I bring these forward with diffidence and great humility. They may or may not be entitled to examination. It is, however, an attempt in a safe direction, and it does not follow that some more efficient explorer of the arcana of nature, may not be privileged to reconcile the discrepancy if any, that prevails between the conflicting testimony of geology, as held by some, and what is generally termed revealed religion.

In the early period of man's history, there was doubtless the same migratory disposition as at the present day. We find it recorded that the eldest son of the first human pair, was the first emigrant. For the period of sixteen or seventeen hundred years between the creation and the Noachian deluge, we may suppose that offshoots were continually transplanting themselves, not only

from the parent stock, but from each other. As men separated from their fellows, they must have become divided into families, groups and tribes, just such as peopled the northern parts of America when discovered by Europeans—wanderers who had lost all trace of their origin and of the primitive civilization,—hunters and fishers—dependant upon the prolific sea, and upon the wild beasts of the forest for food and clothing. It is quite possible and probable, that before that event the northern portions of Europe, in the order of creation, had been peopled with animals of forms and species largely developed, fitted for a previous condition of the earth, but becoming gradually extinct under the operations of altered nature. These fading species would have been contemporary with man, have lived and died around him for ages, until he and they were suddenly removed from the scene by destructive agencies. It is to this buried world that I would direct your attention. If the Noachian deluge erased from the earth by a signal catastrophe all human traces from certain latitudes, and all traces of other animals that existed there, you will see that ages must have elapsed ere traces of man would again become visible, and that then they would be found with a greatly changed contemporary fauna, and a condition of the earth different from that which preceded it. I believe that much of the cave phenomena and of the alluvial deposits in Europe, may be attributed to the Noachian deluge, or catastrophes of the like nature that previously occurred, of which there is no tradition, and that other instances quoted are as truly antediluvian, but after the creation.

There are some remarkable facts in Sir Charles Lyell's work, in connection with deposits in which the remains of man occur associated with those of the extinct animals. 1st.—These deposits are not simple strata—limestones or other rock formations, but are made up of the erosion of such formations including the glacial drift and later accumulations; a loose incoherent mass of chalky marl, sand, gravel and clay—none of which are native of the place where they are found—but brought there by streams from a distance, and from higher grounds. 2ndly.—The remains are not in the relative positions in which we might expect to find those of man, still an inhabitant of the earth, and those of wild animals of such huge forms and assumed fierce dispositions as

were the extinct species. They are just in such proximity or association, as though the extinct monsters had held the same relation to man as the domesticated cattle of the present day—as though it were a millennial period—the teeth of a mammoth being found by the skull of a young person—another skull in a breccia in which was the tooth of a rhinoceros—another in which a perfect flint tool was in close proximity to the leg of a cave bear; and numerous other instances of fraternal position between these and other extinctions and the human race. You of course cannot believe in this harmony of nature, and therefore it is necessary to account for the position of these remains in some other way. It may puzzle you to think how it could have occurred at all, judging from any progressive changes that come under observation at the present day.

But there is another fact to which, in the third place, I beg to advert, and which seems to me to be still more strange when properly considered; but which is relied upon as the strongest evidence of the coeval existence of man with the extinct species. It is the finding of the remains of man and his tools and implements, in the *lowest* part of the *lowest strata* of sand, gravel, &c., both in the cave deposits and river alluvium. I will recite some of these instances:—

Cave Deposits:—

1. The cavern of Pondres, in which human bones occurred in the same mud with the bones of an extinct hyena and rhinoceros. The cavern was in this instance filled up to the roof with mud and gravel in which fragments of two kinds of pottery were detected—the lowest and rudest at the *bottom* of the cave, *below the level of the extinct mammalia*.

2. In the caverns of Engis and Engihoul, on the Meuse.—“Speaking generally, it may be said that human bones, where any were met with, occurred at all depths in the cave mud and gravel, sometimes above, and sometimes *below* those of the bear, elephant, rhinoceros, hyena,” &c.

3. Lyell’s exploration in the Engihoul cavern.—“Bones and teeth of the cave bear were *soon* found, and several other extinct quadrupeds. * * My companion continuing the work perseveringly *for weeks* after my departure, succeeded *at length* in extracting from the same deposit, at the depth of two feet *below*

the crust of stalagmite, three fragments of a human skull, and two perfect lower jaws with teeth, all *associated* in such a manner with the bones of bears, large pachyderms and ruminants, and so precisely resembling these in colour and state of preservation, as to leave no doubt in his mind that man was contemporary with the extinct animals."

4. The Neanderthal cave.—A human skeleton found near the *bottom* of loam which covered the floor of the cave, and the skull near the entrance, as though it had gone into the cave head foremost through some communication with the surface, amongst the *first* matter washed in.

5. The skull of an adult individual found in the Engis cave near Liege, associated with the elephant, rhinoceros, bear, tiger, hyena—all of extinct species, but nevertheless accompanied by a bear, stag, wolf, fox, beaver, and many other quadrupeds of species still living—a fact which has considerable bearing on this question, and which it is as well to keep in remembrance in connection therewith.

6. Caves of Gower in Glamorganshire, South Wales. — "But the discovery of most importance, as bearing on the subject of the present work, is the occurrence in a newly discovered cave, called Long Hole, by Colonel Wood, in 1861, of the remains of two species of rhinoceros, *R. tichorinus* and *R. hemitæchus* (Falconer), in an undisturbed deposit, *in the lower part of which* were some well-shaped flint knives, evidently of human workmanship. It is clear *from their position* that man was coeval with these two species. We have elsewhere independent proofs of his coexistence with every other species of the cave fauna of Glamorganshire; but this is the first well-authenticated example of the occurrence of *R. hemitæchus* in connection with human implements."

River Alluvium :—

7. M. Boucher de Perthes in the first vol. of his "*Antiquites Celtiques*," published in 1847—states that he found flint implements in the *lowest* beds of a series of ancient alluvial strata bordering the valley of the Somme,—the tools were stated to occur at various depths, often twenty or thirty feet from the surface, in sand and gravel, especially in those strata which were nearly in contact with the subjacent white chalk.

8. Dr. Rigollot, having inspected the collection of M. Boucher

de Perthes, returned home, resolved to look for himself for flint tools in the gravel pits near Amiens. There he immediately found abundance of similar flint implements, precisely the same in their make and geological position, some of them in gravel nearly on a level with the Somme, others in similar deposits *resting on chalk*, at a height of about ninety feet above the river.

I need not multiply *unconscious* instances. These are remarkable arrangements of strata. We have man resting on the chalk, or nearly so, along with river and land shells of *living* species. Then come remains of contemporary animals of species which still exist. Then are found mollusca, of species not now living in Northern Europe, and others of living species. Then the cave hyenas, bears, and lions. Then the hippopotamus, rhinoceros, *elephas antiquus* *E. primigenius*, &c.,—the *last* first and the *first* last. Judging from the composition of the strata, which is a mixture and mingling of all the formations from the lowest eocene to the superficial surface accumulations, we certainly might expect to find, here and there, a representative of each of the extinct mammalia. The strange fact is, that they are in reversed order, or in such a position as would imply that a reversion was going on when they were deposited. But if this order of superposition is relied upon as proof that man was coeval in time with all these extinct animals, it ought to be held equally as proof that man existed before them, seeing that his remains are often found, almost as a rule, *beneath* them. While, therefore, it is not improbable that some of the now extinct animals may have come down to his era, we get a much more intelligent glimpse of his true position and time in creation, by finding his remains more intimately associated with species which now exist, which must have been contemporary with him, although created before him.

The geological record may, however, be read in another way—by placing man at the *head* of the creations of the Tertiary period instead of at its *foot*; and then following down from the recent to the eocene, we shall have the *received* order of superposition so far as the strata of the embraced periods are concerned. Man would then be found in his proper place, the associate of all existing species, and probably of some of the extinctions, and with all living species of land and marine mollusca, and would not be found in

simple strata later than the recent, although it would not be extraordinary if his remains should be discovered in mingled strata—that upon which he was created with that upon which the extinct animals roamed and existed. This order does no violence to chronology, but rather sustains it. It makes man the last created mammal, and the cattle preceding him, and the wild beasts later still; and still preceding them extinctions of species for which the earth had become gradually unfitted. It goes further. It settles the point with reference to cave deposits and river alluviums, which are simply the mud of the erosions of surface and lower strata, burdened with the contents of each as the floods have reached them consecutively, sometimes mingled in their passage, or embedded successively at lower levels than the sites from which they had been washed. And this is the reason why we sometimes find flint implements in the lowest beds, or mingled with animal remains in the strata next imposed.

I have thus come shortly, with due reference to the time which reading this paper will occupy, to that stage of progress when exemplifications are necessary to verify the positions I have assumed. I find these, to my own satisfaction at least, in the book to which I have so frequently referred.

Sir Charles Lyell alludes to the investigations made by M. Tournal, an eminent archæologist, in 1828, in the cavern of Bize, in the department of the Aude, South of France. M. Tournal states that in this cavern he had found human bones and teeth, together *with fragments of rude pottery* in the same mud and breccia, cemented by stalagmite, *in which land shells of living species* were imbedded, and the bones of mammalia, some of extinct, *others of recent species*. The human bones were declared by his fellow labourer, M. Marcel de Serres, to be in the same chemical condition as those of the accompanying quadrupeds. Five years later M. Tournal, speaking of these fossils, states that—“they could not be referred to a diluvial catastrophe, but must have been introduced gradually, together with the enveloping sand and gravel *at successive periods*.”

If the pottery described here was in a similar position to that described by M. Christol in the cavern of Pondres, to which I have previously alluded, we may suppose the relics of man in the

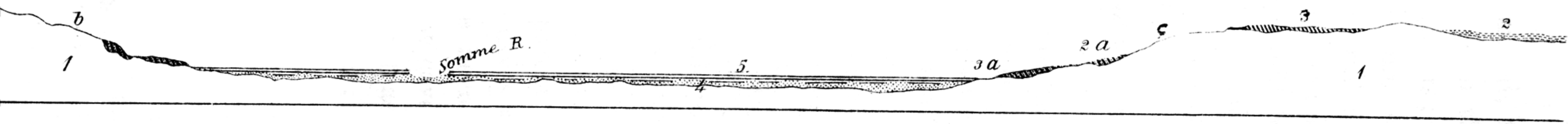
cavern of Bize were *near* the bottom also, *below* the extinct mammalia, and this taken with M. Tournal's assertion that they were introduced *at successive periods*, enables me to draw the following inference in support of my views:—

We have no data to determine in what condition this part of the earth may have been at the period assigned as that of man's creation. We know of but one spot that is said to have been altogether pleasant. That previous to that event various species of animals roamed here, died, and became embedded, is exceedingly probable. Man at length came upon the scene, lived and died also. Consequently his remains and his works, with those of recent species, and those of extinctions, if some of them came down to his era, lay at the surface. Ages elapse, oscillations occur, and there are signs of approaching submergence of the land. Floods are frequent, sweeping the surface of its contents, and precipitating them into rents, communicating with systems of subterranean channels and caves. They form the undermost deposits in all such caves. Oscillations continue, *lower strata* are exposed and eroded, and bones of quadrupeds, extinct even then, are washed out, and they too are precipitated into caverns and channels, and form a superimposed secondary deposit. The grand submergence takes place—the Noachian deluge prevails in these latitudes—the quick upheaval follows, and animal relics, bones clothed with flesh, but rent and dismembered by conflicting elements, are introduced. In process of time stalactite drips through the roof, and stalagmite covers the floor of the caverns, which remain in that condition until developed by scientific research, a subject of speculation in the nineteenth century of the Christian era.

Time will not permit me to discuss this portion of the subject at much greater length. It may however be observed that there will be various modifications of cave deposits; and that although the proper place of human remains, washed from the surface and higher levels, is underneath other remains, when so found, it may have been that caverns were filled with relics long before man appeared; and in these the extinct animals and perhaps existing species may have mingled, and the remains of man, if any, washed in at a future period, would then be in the upper stratum. There ought to be no mistaking the geological age of caverns like these. It

may have been also, and the case seems proved, that bones and implements of man have been washed out from the surface, and rolled in the beds or channels of rivers or torrents; and that lower strata, in which reposed the remains of older animals being reached, that both may have been mingled and further rolled and triturated in the same streams for a long time, before communication with the interior was made—and thus these remains would be identical “in appearance, colour, and chemical condition,”—then they may have gone in a mingled mass into the cavernous passages and fissures, and would be found, as Schmerling found his deposits in the Enjis and Engihoul caverns before referred to—at all depths, and their respective ages undistinguishable.

I cannot discover any good reason why man and many animals now extinct, may not have existed together in the chronologic era, from the creation to the deluge. On the contrary, the evidence appears to me to favour their coexistence. That the Noachian deluge was partial or otherwise, is not now the question—that there was such an event universal tradition would inspire the conviction, even though the record were lost. Allowing then that it extended to northern regions inhabited by man, some of the caverns near the sea, those at Brixham, in Devon, for instance, in which animal bones and flint implements are found, may be referable to such a disturbance, and others to the period immediately after. There are several circumstances connected with the Brixham caves which favour this opinion. Some worn pebbles of hematite found in them, could only have come from their nearest parent rock at a period when the valleys immediately adjoining the caves were much shallower than they now are. This may have been the time of the deposition of the gravel and stones in these caves. The reddish loam in which the bones are imbedded, is such as may be seen on the surface of limestone in the neighbourhood; but the currents which were formerly charged with such mud must have run at a level 78 feet above that of the stream now flowing in the same valley—and to this time we may refer the bone deposits. It accords also with the phenomena of that event, that there is good evidence in the discovery in the mud at the bottom of the bone earth and close to the flint knives, of the entire limb of a cave bear, which must have been introduced clothed with its flesh, or with the



Relative position of the Deposits &c in the Valley of the Somme.

(See p. 93)

bones bound together by their natural ligaments, of the co-existence of man with mammals since extinct. It further appears that the waters at first must have been propelled through these channels with great force, and thus accumulated the stony fragments—that succeeding this torrent there was a regular current, and that then fine mud and bones accumulated—and that when this stayed the stalagmite floor was gradually formed.

I might point to other instances of cavern deposits, which seem to corroborate the received chronology with reference to the age of man, which I find no valid reason for carrying back to remoter periods. I shall however rest this part of the case with the facts quoted, and proceed to examine my theory by the evidence afforded by river deposits, containing bones of extinct mammalia and flint implements similar to those of the caves.

It must be borne in mind that these alluvial deposits in valleys, are made up of erosions and denudations of the surface strata, and are similar to those which are found in caverns. We ought therefore to have the *same* phenomena—or with slight modifications—in both ; and it is so. The same inverted strata meet us here openly, which met us in the underground passages and caves communicating with the surface. In the diagram* before you, which is a section across the valley of the Somme in Picardy, you will find the regular order of superposition of strata—first the chalk (1), next the eocene strata (2), then the loam, or drift, or brick earth (3). Next you will find the upper and lower level gravels made up of denudations, which I have marked—upper (2 a), and lower (3 a); then the gravel bed (4), the peat (5), and the river Somme, as it now runs, (6). I will read the description (with these figures) from Sir Charles Lyell's book, and afterwards make a short commentary upon it, in accordance with my own views.—

“The valley of the Somme in Picardy is situated geologically in a region of white chalk with flints, the strata of which are nearly horizontal. The chalk hills which bound the valley are almost everywhere between 200 and 300 feet in height. On ascending to that elevation we find ourselves on an extensive table land, in which there are slight elevations and depressions. The white chalk itself is scarcely ever exposed at the surface on this plateau, although

* This is copied from the section in Sir Charles Lyell's book, and is not correct, but will give an idea of the position of the various deposits. (See section.)

seen on the slopes of the hills, as at *b* and *c*. The general surface of the upland region is covered continuously for miles in every direction by loam or brick earth (3) about five feet thick, devoid of fossils. To the wide extent of this loam the soil of Picardy chiefly owes its great fertility. Here and there we also observe on the chalk outlying patches of tertiary sand and clay, with eocene fossils (2), the remnants of a formation once more extensive, and which probably once spread in one continuous mass over the chalk, before the present system of valleys had begun to be shaped out. It is necessary to allude to these relics of tertiary strata, of which the larger part is missing, because their denudation has contributed largely to furnish the materials of gravels in which the flint implements and bones of extinct mammalia are entombed. From this source have been derived not only regular formed egg shaped pebbles, so common in the old fluviatile alluvium at all levels, but huge masses of sandstone several feet in diameter. The upland loam also (3) has often, in no slight degree, been formed at the expense of the same tertiary sands and clays, as is attested by its becoming more or less sandy or argillaceous, according to the nature of the nearest eocene outlier in the neighbourhood. The average width of the valley of the Somme between Amiens and Abbeville is one mile.

“It will be seen by the description given of the section, that (3 *a*) indicates the lower level gravels, and (2 *a*) the higher ones, or those rising to elevations of eighty or a hundred feet above the river. Newer than these is the peat (5), which is from ten to thirty feet in thickness, and which is not only of later date than the alluvium (3 *a*) and (2 *a*), but is also posterior to the denudation of those gravels, or to the time when the valley was excavated through them. Underneath the peat is a bed of gravel (4), from three to fourteen feet thick, which rests on undisturbed chalk. This gravel was probably formed, in part at least, when the valley was scooped out to its present depth, since which time no geological change has taken place except the growth of the peat, and certain oscillations in the general level of the country. A thin layer of impervious clay separates the gravel (4) from the peat (5), and seems to have been a necessary preliminary to the growth of the peat.”

I may sum up the substance of this description in a few words. If my theory of inversion be sufficient to account for the finding of the remains of man in mixed strata—no violence will be done either to the scriptural or geological record. They will fall into their proper place in the order of creation. So also will those of the recent animals cotemporary with man: and so also will those of the extinct mammalia.

The valley of the Somme and the hills by which it is bounded, must at one time have been the bottom of a large cretaceous lake, which communicated with the sea. When the elevation of this basin into dry land occurred, the chalk arose covered continuously with a loose and incoherent eocene formation of sand and gravel containing contemporary mollusca. There is no evidence to show that this eocene strata, lying directly on the chalk, was ever inhabited, except by fresh water or land shells, up to the glacial period. As this came on and continued, there may have been great depression and submergence of the land—the loam and clay being then deposited that cover the country, much thicker than they now are, and destitute of fossils. There was a corresponding re-elevation and denudation—the surface of the country rose slowly above the reach of the water, but the configuration of the land caused a broad, deep, and rapid stream, perhaps ice laden, to run where the valley of the Somme now is, sweeping away what remained there of the superficial deposit, eroding the eocene strata, excavating the valley down to the chalk, and also eroding its sides. This stream, as oscillations occurred, may have run at a higher or lower level, but remained for a long time at the upper level (2 a) where its eddies accumulated the upper level gravels, which extended on either side the valley towards its centre. The higher dry land would have been overspread with herbage, and have nourished and sustained living creatures—*elephas primigenius*, *rhinoceros tichorinus*, *equus fossilis*, and other extinctions which then had roamed from more southern latitudes subsequent to the glacial era, and their remains became embedded. Long previous to the time of man's appearance on this scene, and before his creation, some of these races became extinct.

At length man in his continued migration, from the cradle of the human race, arrived at and roamed over the country, as wild as civilized man found the aborigines of this continent—wearing the skins of beasts—using stone implements and flint weapons, and possessed of the useful art of making rude pottery. He too peopled the country for ages—hunted, and lived and died there. Suppose now that the Noachian deluge affected these latitudes—that another great depression took place, and all the high hills were quietly covered by the waters—and shortly afterwards a corresponding re-

elevation. What then would have been the effect upon the surface deposits of the lands bounding the valley of the Somme? The broad waters would have been charged, first, with the uppermost stratum, the remains of man and his works, and those of contemporary fauna. Secondly, with remains of other and older mammalia—all which would have been deposited in their order on the chalky shelf (2 *a*) in the eddies of the swift stream that ran at that height, and have formed part of the alluvium (2 *a*) mingled with eocene strata (2) and extending into the valley. Thirdly, with part of the remaining unfossiliferous loam and drift which cap these gravels. As the waters decreased, the stream, cutting through (2 *a*) would have swept it nearly all away, depositing its sediment charged with its material and other debris, at (3 *a*), which would then have been the bottom of the valley, and in its turn would have succumbed to the still decreasing downward impetuous flood; and all the finer particles having now disappeared, would have left the rough gravel (4) resting upon the chalk—the newest deposit except the peat, of the valley of the Somme—and then the waters having subsided the river would have formed its present channel or something very like it, and the peat would have begun to grow.

This is my comment upon the geological deposits of the valley of the Somme. If just, it rescues them from the long past ages to which Sir Charles Lyell and other geologists have consigned man and his works, and so far as these last are concerned, brings them down to a period between the creation and the Noachian deluge. It does not, however, necessarily implicate this last event as the sole agent by which these deposits were made, for oscillations of the land and changes of level in this region, may have caused inundations which would have produced the same results. But it does show that the antiquity of man, judged by the received chronology, need no longer be a subject of dispute, or doubt, especially by the believers of Divine revelation.

The generations immediately after the Noachian deluge, buried their dead out of their sight. We have a record of this in the life of Abraham, who purchased the cave and the field of Machpelah from Ephron the Hittite, the children of Heth being witnesses; and such burial places were held sacred, sometimes visited by survivors, and occasionally opened to admit another tenant to the narrow

house. We do not for a moment suppose that Abraham originated this custom—but it may have been an *antediluvian* one,—and we therefore have a warranty to search for an antediluvian cave or grotto set apart for the sacred rite of burial. Sir Charles Lyell has found one, which he says “seems clearly to have been a sepulchral vault of the *post-pliocene!* period,” near Aurignac, not far from the foot of the Pyrenees, thus carrying back its age tens of thousands of years probably before the assumed period of man’s creation.

It is a grotto in the side of the hill of Fajoles, near the town of Aurignac, in the department of the Haute-Garonne, near a spur of the Pyrenees. The discovery was made by a workman (Bonne-maison), who observed that rabbits when chased ran to this spot to burrow. On reaching into the hole, he laid hold of, and drew out, much to his surprise, one of the long bones of a human skeleton. Digging into the talus he came to a large stone slab, which formed the closure of a grotto, the inside of which was almost filled with bones, among which were two human skulls. He communicated the circumstance to M. Amiel, the mayor of Aurignac, and the discovery made a great sensation. The bones were all re-interred in the parish cemetery, but not before M. Amiel, who was a medical man, and had a knowledge of anatomy, ascertained that they must have formed part of seventeen skeletons of both sexes and all ages, some so young that the ossification of the bones was incomplete. He also remarked that they must have been a race of small stature. Unfortunately the skulls were injured in the transfer, and after the lapse of eight years, when M. Lartet visited Aurignac, and a further investigation was about to be made, the sexton was unable to tell where the remains had been buried, and they have not been re-discovered to this day.

Outside this cave, among ashes and some overlying earthy layers, separating the ashes from the talus, were a great variety of bones and implements—a stone of a circular form flattened on two sides, arrows without barbs, other tools made of reindeers’ horns, and a bodkin formed out of the more compact horn of a roe deer. Among the cinders outside the vault were fragments of fissile sandstone reddened by heat, which were observed to rest on a level surface of nummulitic limestone, and to have formed a hearth. There

were no human bones on the outside of the grotto, and of the various species of animals there were extinct and living species—among the former—*ursus spelæus*, *felis spelæa*, and *hyena spelæa*, *carnivora*,—*elephas primigenius*, *rhinoceros tichorinus*, *megaceros Hibernicus*, *herbivora*; and of the latter—badger, polecat, wildcat, wolf, and fox, *carnivora*,—and the pig, stag, roebuck, reindeer, and aurochs, *herbivora*.

This is a short summary of the history of the Aurignac relics. It is, to say the least, a singular instance of human remains, not enveloped in a preserving matrix, remaining for *so long* a period undecomposed. If we give them the age assumed for them by Sir Charles Lyell, they may have lain there hundreds of thousands of years, a long time for traditions or customs of burial to have been retained which descended to Abraham. But if we allow that the extinct mammalia may have peopled this region between the creation and the deluge, the fact of cave burial and the post-diluvian custom or tradition will be much more intelligible. The fossilization of the young bones in process of growth, is another marvel. And almost equally so, after the sensation excited by the discovery, is the total oblivion that fell upon the Aurignac sexton, of the spot where the remains were re-interred.

The only good reason I can discover for attributing so great an age to these human remains, is their association with those of many extinct animals, which are known to have existed and roamed the earth long ages previous to the period assigned for the creation of man. If, however, these extinctions came down to the date of the Adamic chronology, and I believe that most of them did so, equally with those which are still living species, this reason would not apply—for we might expect to find them here, the natural enemies and the food of man. We might then suppose this cave to be a burial place of some small emigrant tribe of antediluvians, who in a few generations after the first man, had found their way to this region from the centre of the race, and had hunted, and lived and feasted upon the animals of the chase, such as the remains are described to be. Against this supposition is the stated fact, that *no change* in the physical configuration of the district, such as a flood would have made, has taken place since the grotto was a place of sepulture. But if the Noachian deluge were a partial one,

which is a tenet of the modern school of philosophy, if they admit it at all, a good deal may be made out of Sir Charles Lyell's own argument in support of this theory of the age of the remains in the Aurignac grotto. Thus he says—"It is the normal state of the earth's surface to be undergoing great alterations in one place, while other areas, often in close proximity, remain for ages without any modification. In one region, rivers are deepening and widening their channels, or the waves of the sea are undermining cliffs, or the land is sinking beneath or rising above the waters, century after century, or the volcano is pouring forth torrents of lava, or showers of ashes; while in tracts *hard by*, the ancient forest, or extensive heath, or the splendid city, continue scatheless and motionless." There may then have been elevations here, and depressions at no great distance. The floods which covered the face of the country in other parts, and filled caves with the bones of men, and animals now extinct, whether Noachian, or a consequence of them, or otherwise, may have spared the region in which the Aurignac grotto is situated, while they fulfilled their mission upon the fauna at a distance, nigh or afar. The Aurignac grotto, therefore, while it shows that man may have existed with animals now extinct, affords no proof that he was as old in time as they; or even that all the monstrous existences that peopled the world at his advent, became extinct at the great catastrophe which preserved a large proportion of the species that now remain.

Our own country affords some remarkable instances of the presence of man and his works on the scene, long previous to its discovery by Europeans, and the introduction of civilization and refinement. It is easily ascertained at the present day, that the aboriginal race in this part of the continent, lived by hunting and fishing, and used stone and bone weapons of offence and defence, and implements of industry or domestic economy, precisely similar in form and fashion to those that stretch beyond the historic period in Europe. There has been no intervening bronze age in this part of the American continent. The remains and relics are the veritable weapons, utensils and pottery, in type and material, as were used by the remotest Gaul, Briton, and Scandinavian, long before a bronze implement was introduced among them. We are thus pointed to an interesting fact. That the ancient people of Europe had become

isolated from the centre of civilization, and had lost all tradition of it, except of one event; and were to it as unknown as was America, (to which the human family had also gradually spread), until the days of Columbus. The wonderful tales of the heathen mythology may therefore be no longer myths when taken in connection with the subject of the antiquity of man, and the discovery, in the north of Europe, of a new country and a strange people, and the reclamation of their millions to a state of half civilization, and an exchange of stone for the more useful and ornamental bronze and gold and silver. The time is too far distant to enable us to judge correctly whether the intruders supplanted, as on this continent they are gradually doing, or amalgamated with, the aboriginal race. The Fin, the Lap, and the Esquimaux, in the extreme north, in their lineaments and stature, their customs and usages, seem to favour the idea of a people retreating beyond the influence of manners and modes of life which they could not appreciate, and were powerless to withstand; and the ancient painted Briton, clothed in the skins of beasts, with his fishing coracle, so like the Indian, contrasted with the war chariots and splendour of his chiefs, and the power of the Druidical priesthood, leads us to believe that the advent of a superior race was attended with consequences to the aborigines of the old world, very similar to those which have been produced in the new. That advent was certainly post-diluvian, although no authentic record remains that can be depended on, of the settlement or conquest by which it was made.

One great cause of scepticism is the readiness with which mankind yield their belief to theories put forth with show of reason, by those whom they regard as superior intelligences, and in whom they repose implicit confidence. Let a man do some great thing which will bear the test of enquiry in every possible shape, and become famous thereby, and he may afterwards commit a thousand vagaries, and find multitudes to uphold him. A Lyell, a Darwin, or a Huxley, may go a long way in the path of human knowledge, make important discoveries, and satisfy the world that all they do is right and just and proper—and that therefore their theories, equally with their facts, may be received with faith equal to that which should follow plain demonstration. But there is no reason why we should respect their speculations as we do

their truths, seeing that, although in their own hands, they lead to nothing, and are nothing. Such an impotent conclusion has met Lyell, who expects to find remains of man in the submerged forest at Cromer, where they are not to be found. Such also has met Darwin, who has let go his belief in creation, and adopts variation of species instead; and such also meets Huxley, who traces back organized being to molecules, so much alike in every species, that all his philosophy cannot distinguish one from another, and who is yet compelled to acknowledge that the molecule of a horse produces a horse, that of a bear a bear, that of a camel a camel, and that of a man—although exactly like the others—a man. We must, therefore, be careful while giving due credit for the truths that such men teach, not to be led away by speculation which is not truth, and to which the test of truth cannot be applied with any satisfactory results.

But it is time that I should bring these observations to a close. We are all searching after truth—whether we look to find it in the past, of the beginning and progress of which we know so little, and which seems to our finite capacities an eternity of duration,—or in the present, in which we have an interest for three score years and ten, to mould it for the future,—or forward to that future, whose duration will be infinite, and in which we expect to be partakers of another form of existence that shall not change. We glean here and there, with the depths of the wisdom so dearly purchased for us by the first man with the penalty of a short life, a few startling facts, which create in us wonder and awe at the stupendous work of creation. We reason upon them with the aid of science, and make a little progress in unravelling their history, and are then brought to a stand still, or are lost in endless and unprofitable speculation. Looking backward or forward, and investigating as we may, we find no theory so stable as the recorded order of creation—none with which our geological facts so well agree;—and as this has not been written in detail, and therefore not so much for our learning as the exercise of our faith and for our edification, we may rest assured that our faculties are given us, less on account of what has been done, than for what there is to do; and that the exploration of the earth for the past history of man is of little consequence as it concerns his present happiness,

to say nothing of the future, while it only tends to perplex his ideas and unsettle his reason. Taking this view of the subject I am quite content in my belief that man was the last mammal created. That he had his time and place assigned to him in that sublime expression of the Will of the Almighty Creator, with whom to will is to execute, Who said—"Let us make man in Our image, after Our likeness—and let them have dominion over the fish of the sea—and over the fowl of the air—and over the cattle—and over all the earth—and over every creeping thing that creepeth upon the earth."

ART. X. NOTES ON THE WEATHER AT HALIFAX, NOVA SCOTIA,
DURING 1864. BY COLONEL MYERS.

[*Read Monday Evening, April 6, 1865.*]

THE year 1864 began with a gale of wind from S. E., and snow, which latter, however, soon turned to rain. The remainder of the month of January was generally fine, and, with the exception of two days, when the mercury stood a few degrees below zero, the weather was mild for the season. The mean temperature was 23° , being 7° lower than it was in 1863.

The weather in February was unsettled; the mean temperature 26° , being 3° higher than in 1863.

March was stormy and unsettled; mean temperature 28° , being 3° higher than 1863.

April weather variable, with high winds; mean temperature 36° , being 2° lower than in 1863.

May generally fine, though fogs were frequent; mean temperature 48° , being 10° higher than 1863.

June fine, but season backward, in consequence of the want of rain and prevalence of cold sea fogs; mean temperature 57° , being 3° higher than in 1863.

July very fine and dry; mean temperature 62° , being 3° lower than 1863.

August, though generally fine was characterized by occasional heavy rains; mean temperature 64° , being exactly the same as last year.

September very fine, with the exception of a few days of heavy rain; mean temperature 56° , being 2° lower than 1863.