History of the Warfare of Science with Theology in Christendom

（Volume III）

by Andrew Dickson White

CONTENTS

CHAPTER V. FROM GENESIS TO GEOLOGY.

I. GROWTH OF THEOLOGICAL EXPLANATIONS.

Among the philosophers of Greece we find, even at an early period, germs of geological truth, and, what is of vast importance, an atmosphere in which such germs could grow. These germs were transmitted to Roman thought; an atmosphere of tolerance continued; there was nothing which forbade unfettered reasoning regarding either the earth's strata or the remains of former life found in them, and under the Roman Empire a period of fruitful observation seemed sure to begin.

But, as Christianity took control of the world, there came a great change. The earliest attitude of the Church toward geology and its kindred sciences was indifferent, and even contemptuous. According to the prevailing belief, the earth was a "fallen world," and was soon to be destroyed. Why, then, should it be studied? Why, indeed,

give a thought to it? The scorn which Lactantius and St. Augustine had cast upon the study of astronomy was extended largely to other sciences.

But the germs of scientific knowledge and thought developed in the ancient world could be entirely smothered neither by eloquence nor by logic; some little scientific observation must be allowed, though all close reasoning upon it was fettered by theology. Thus it was that St. Jerome insisted that the broken and twisted crust of the earth exhibits the wrath of God against sin, and Tertullian asserted that fossils resulted from the flood of Noah.

To keep all such observation and reasoning within orthodox limits, St. Augustine, about the beginning of the fifth century, began an effort to develop from these germs a growth in science which should be sacred and safe. With this intent he prepared his great commentary on the work of creation, as depicted in Genesis, besides dwelling upon the subject in other writings. Once engaged in this work, he gave himself to it more earnestly than any other of the

earlier fathers ever did; but his vast powers of research and thought were not directed to actual observation or reasoning upon observation. The keynote of his whole method is seen in his famous phrase, "Nothing is to be accepted save on the authority of Scripture, since greater is that authority than all the powers of the human mind." All his thought was given to studying the letter of the sacred text, and to making it explain natural phenomena by methods purely theological.

Among the many questions he then raised and discussed may be mentioned such as these: "What caused the creation of the stars on the fourth day?" "Were beasts of prey and venomous animals created before, or after, the fall of Adam? If before, how can their creation be reconciled with God's goodness; if afterward, how can their creation be reconciled to the letter of God's Word?" "Why were only beasts and birds brought before Adam to be named, and not fishes and marine animals?" "Why did the Creator not say, 'Be fruitful and multiply,' to plants as well as to animals?"

Sundry answers to these and similar questions formed the main contributions of the greatest of the Latin fathers to the scientific knowledge of the world, after a most thorough study of the biblical text and a most profound application of theological reasoning. The results of these contributions were most important. In this, as in so many other fields, Augustine gave direction to the main current of thought in western Europe, Catholic and Protestant, for nearly thirteen centuries.

In the ages that succeeded, the vast majority of prominent scholars followed him implicitly. Even so strong a man as Pope Gregory the Great yielded to his influence, and such leaders of thought as St. Isidore, in the seventh century, and the Venerable Bede, in the eighth, planting themselves upon Augustine's premises, only ventured timidly to extend their conclusions upon lines he had laid down.

In his great work on Etymologies, Isidore took up Augustine's attempt to bring the creation into satisfactory

relations with the book of Genesis, and, as to fossil remains, he, like Tertullian, thought that they resulted from the Flood of Noah. In the following century Bede developed the same orthodox traditions.

The best guess, in a geological sense, among the followers of St. Augustine was made by an Irish monkish scholar, who, in order to diminish the difficulty arising from the distribution of animals, especially in view of the fact that the same animals are found in Ireland as in England, held that various lands now separated were once connected. But, alas! the exigencies of theology forced him to place their separation later than the Flood. Happily for him, such facts were not yet known as that the kangaroo is found only on an island in the South Pacific, and must therefore, according to his theory, have migrated thither with all his progeny, and along a causeway so curiously constructed that none of the beasts of prey, who were his fellow voyagers in the ark, could follow him.

These general lines of thought upon geology and its

kindred science of zoology were followed by St. Thomas Aquinas and by the whole body of medieval theologians, so far as they gave any attention to such subjects.

The next development of geology, mainly under Church guidance, was by means of the scholastic theology. Phrase making was substituted for investigation. Without the Church and within it wonderful contributions were thus made. In the eleventh century Avicenna accounted for the fossils by suggesting a "stone making force"; in the thirteenth, Albert the Great attributed them to a "formative quality;" in the following centuries some philosophers ventured the idea that they grew from seed; and the Aristotelian doctrine of spontaneous generation was constantly used to prove that these stony fossils possessed powers of reproduction like plants and animals.

Still, at various times and places, germs implanted by Greek and Roman thought were warmed into life. The Arabian schools seem to have been less fettered by the letter of the Koran than the contemporary Christian

scholars by the letter of the Bible; and to Avicenna belongs the credit of first announcing substantially the modern geological theory of changes in the earth's surface.

The direct influence of the Reformation was at first unfavourable to scientific progress, for nothing could be more at variance with any scientific theory of the development of the universe than the ideas of the Protestant leaders. That strict adherence to the text of Scripture which made Luther and Melanchthon denounce the idea that the planets revolve about the sun, was naturally extended to every other scientific statement at variance with the sacred text. There is much reason to believe that the fetters upon scientific thought were closer under the strict interpretation of Scripture by the early Protestants than they had been under the older Church. The dominant spirit among the Reformers is shown by the declaration of Peter Martyr to the effect that, if a wrong opinion should obtain regarding the creation as described in Genesis, "all the promises of Christ fall into nothing, and all the life of our religion

would be lost."

In the times immediately succeeding the Reformation matters went from bad to worse. Under Luther and Melanchthon there was some little freedom of speculation, but under their successors there was none; to question any interpretation of Luther came to be thought almost as wicked as to question the literal interpretation of the Scriptures themselves. Examples of this are seen in the struggles between those who held that birds were created entirely from water and those who held that they were created out of water and mud. In the city of Lubeck, the ancient centre of the Hanseatic League, close at the beginning of the seventeenth century, Pfeiffer, "General Superintendent" or bishop in those parts, published his Pansophia Mosaica, calculated, as he believed, to beat back science forever. In a long series of declamations he insisted that in the strict text of Genesis alone is safety, that it contains all wisdom and knowledge, human and divine. This being the case, who could care to waste time on

the study of material things and give thought to the structure of the world? Above all, who, after such a proclamation by such a ruler in the Lutheran Israel, would dare to talk of the "days" mentioned in Genesis as "periods of time"; or of the "firmament" as not meaning a solid vault over the universe; or of the "waters above the heavens" as not contained in a vast cistern supported by the heavenly vault; or of the "windows of heaven" as a figure of speech?

In England the same spirit was shown even as late as the time of Sir Matthew Hale. We find in his book on the Origination of Mankind, published in 1685, the strictest devotion to a theory of creation based upon the mere letter of Scripture, and a complete inability to draw knowledge regarding the earth's origin and structure from any other source.

While the Lutheran, Calvinistic, and Anglican Reformers clung to literal interpretations of the sacred books, and turned their faces away from scientific investigation, it was among their contemporaries at the

revival of learning that there began to arise fruitful thought in this field. Then it was, about the beginning of the sixteenth century, that Leonardo da Vinci, as great a genius in science as in art, broached the true idea as to the origin of fossil remains; and his compatriot, Fracastoro, developed this on the modern lines of thought. Others in other parts of Europe took up the idea, and, while mixing with it many crudities, drew from it more and more truth. Toward the end of the sixteenth century Bernard Palissy, in France, took hold of it with the same genius which he showed in artistic creation; but, remarkable as were his assertions of scientific realities, they could gain little hearing. Theologians, philosophers, and even some scientific men of value, under the sway of scholastic phrases, continued to insist upon such explanations as that fossils were the product of "fatty matter set into a fermentation by heat"; or of a "lapidific juice"; or of a "seminal air"; or of a "tumultuous movement of terrestrial exhalations"; and there was a prevailing belief that fossil remains, in general, might

be brought under the head of "sports of Nature," a pious turn being given to this phrase by the suggestion that these "sports" indicated some inscrutable purpose of the Almighty.

This remained a leading orthodox mode of explanation in the Church, Catholic and Protestant, for centuries.

II. EFFORTS TO SUPPRESS THE SCIENTIFIC VIEW

But the scientific method could not be entirely hidden; and, near the beginning of the seventeenth century, De Clave, Bitaud, and De Villon revived it in France. Straightway the theological faculty of Paris protested against the scientific doctrine as unscriptural, destroyed the offending treatises, banished their authors from Paris, and forbade them to live in towns or enter places of public resort.

The champions of science, though depressed for a time, quietly laboured on, especially in Italy. Half a century later, Steno, a Dane, and Scilla, an Italian, went still further

in the right direction; and, though they and their disciples took great pains to throw a tub to the whale, in the shape of sundry vague concessions to the Genesis legends, they developed geological truth more and more.

In France, the old theological spirit remained exceedingly powerful. About the middle of the eighteenth century Buffon made another attempt to state simple geological truths; but the theological faculty of the Sorbonne dragged him at once from his high position, forced him to recant ignominiously, and to print his recantation. It runs as follows: "I declare that I had no intention to contradict the text of Scripture; that I believe most firmly all therein related about the creation, both as to order of time and matter of fact. I abandon everything in my book respecting the formation of the earth, and generally all which may be contrary to the narrative of Moses." This humiliating document reminds us painfully of that forced upon Galileo a hundred years before.

It has been well observed by one of the greatest of

modern authorities that the doctrine which Buffon thus "abandoned" is as firmly established as that of the earth's rotation upon its axis. Yet one hundred and fifty years were required to secure for it even a fair hearing; the prevailing doctrine of the Church continued to be that "all things were made at the beginning of the world," and that to say that stones and fossils were made before or since "the beginning" is contrary to Scripture. Again we find theological substitutes for scientific explanation ripening into phrases more and more hollow making fossils "sports of Nature," or "mineral concretions," or "creations of plastic force," or "models" made by the Creator before he had fully decided upon the best manner of creating various beings.

Of this period, when theological substitutes for science were carrying all before them, there still exists a monument commemorating at the same time a farce and a tragedy. This is the work of Johann Beringer, professor in the University of Wurzburg and private physician to the

Prince Bishop the treatise bearing the title Lithographiae Wirceburgensis Specimen Primum, "illustrated with the marvellous likenesses of two hundred figured or rather insectiform stones." Beringer, for the greater glory of God, had previously committed himself so completely to the theory that fossils are simply "stones of a peculiar sort, hidden by the Author of Nature for his own pleasure," that some of his students determined to give his faith in that pious doctrine a thorough trial. They therefore prepared a collection of sham fossils in baked clay, imitating not only plants, reptiles, and fishes of every sort that their knowledge or imagination could suggest, but even Hebrew and Syriac inscriptions, one of them the name of the Almighty; and these they buried in a place where the professor was wont to search for specimens. The joy of Beringer on unearthing these proofs of the immediate agency of the finger of God in creating fossils knew no bounds. At great cost he prepared this book, whose twenty two elaborate plates of facsimiles were forever to

settle the question in favour of theology and against science, and prefixed to the work an allegorical title page, wherein not only the glory of his own sovereign, but that of heaven itself, was pictured as based upon a pyramid of these miraculous fossils. So robust was his faith that not even a premature exposure of the fraud could dissuade him from the publication of his book. Dismissing in one contemptuous chapter this exposure as a slander by his rivals, he appealed to the learned world. But the shout of laughter that welcomed the work soon convinced even its author. In vain did he try to suppress it; and, according to tradition, having wasted his fortune in vain attempts to buy up all the copies of it, and being taunted by the rivals whom he had thought to overwhelm, he died of chagrin. Even death did not end his misfortunes. The copies of the first edition having been sold by a graceless descendant to a Leipsic bookseller, a second edition was brought out under a new title, and this, too, is now much sought as a precious memorial of human credulity.

But even this discomfiture did not end the idea which had caused it, for, although some latitude was allowed among the various theologico scientific explanations, it was still held meritorious to believe that all fossils were placed in the strata on one of the creative days by the hand of the Almighty, and that this was done for some mysterious purpose, probably for the trial of human faith.

Strange as it may at first seem, the theological war against a scientific method in geology was waged more fiercely in Protestant countries than in Catholic. The older Church had learned by her costly mistakes, especially in the cases of Copernicus and Galileo, what dangers to her claim of infallibility lay in meddling with a growing science. In Italy, therefore, comparatively little opposition was made, while England furnished the most bitter opponents to geology so long as the controversy could be maintained, and the most active negotiators in patching up a truce on the basis of a sham science afterward. The Church of England did, indeed, produce some noble men, like Bishop

Clayton and John Mitchell, who stood firmly by the scientific method; but these appear generally to have been overwhelmed by a chorus of churchmen and dissenters, whose mixtures of theology and science, sometimes tragic in their results and sometimes comic, are among the most instructive things in modern history.

We have already noted that there are generally three periods or phases in a theological attack upon any science. The first of these is marked by the general use of scriptural texts and statements against the new scientific doctrine; the third by attempts at compromise by means of far fetched reconciliations of textual statements with ascertained fact; but the second or intermediate period between these two is frequently marked by the pitting against science of some great doctrine in theology. We saw this in astronomy, when Bellarmin and his followers insisted that the scientific doctrine of the earth revolving about the sun is contrary to the theological doctrine of the incarnation. So now against geology it was urged that the scientific doctrine that fossils

represent animals which died before Adam contradicts the theological doctrine of Adam's fall and the statement that "death entered the world by sin."

In this second stage of the theological struggle with geology, England was especially fruitful in champions of orthodoxy, first among whom may be named Thomas Burnet. In the last quarter of the seventeenth century, just at the time when Newton's great discovery was given to the world, Burnet issued his Sacred Theory of the Earth. His position was commanding; he was a royal chaplain and a cabinet officer. Planting himself upon the famous text in the second epistle of Peter, he declares that the flood had destroyed the old and created a new world. The Newtonian theory he refuses to accept. In his theory of the deluge he lays less stress upon the "opening of the windows of heaven" than upon the "breaking up of the fountains of the great deep." On this latter point he comes forth with great strength. His theory is that the earth is hollow, and filled with fluid like an egg. Mixing together sundry texts

from Genesis and from the second epistle of Peter, the theological doctrine of the "Fall," an astronomical theory regarding the ecliptic, and various notions adapted from Descartes, he insisted that, before sin brought on the Deluge, the earth was of perfect mathematical form, smooth and beautiful, "like an egg," with neither seas nor islands nor valleys nor rocks, "with not a wrinkle, scar, or fracture," and that all creation was equally perfect.

In the second book of his great work Burnet went still further. As in his first book he had mixed his texts of Genesis and St. Peter with Descartes, he now mixed the account of the Garden of Eden in Genesis with heathen legends of the golden age, and concluded that before the flood there was over the whole earth perpetual spring, disturbed by no rain more severe than the falling of the dew.

In addition to his other grounds for denying the earlier existence of the sea, he assigned the reason that, if there had been a sea before the Deluge, sinners would have

learned to build ships, and so, when the Deluge set in, could have saved themselves.

The work was written with much power, and attracted universal attention. It was translated into various languages, and called forth a multitude of supporters and opponents in all parts of Europe. Strong men rose against it, especially in England, and among them a few dignitaries of the Church; but the Church generally hailed the work with joy. Addison praised it in a Latin ode, and for nearly a century it exercised a strong influence upon European feeling, and aided to plant more deeply than ever the theological opinion that the earth as now existing is merely a ruin; whereas, before sin brought on the Flood, it was beautiful in its "egg shaped form," and free from every imperfection.

A few years later came another writer of the highest standing William Whiston, professor at Cambridge, who in 1696 published his New Theory of the Earth. Unlike Burnet, he endeavoured to avail himself of the Newtonian idea, and brought in, to aid the geological

catastrophe caused by human sin, a comet, which broke open "the fountains of the great deep."

But, far more important than either of these champions, there arose in the eighteenth century, to aid in the subjection of science to theology, three men of extraordinary power John Wesley, Adam Clarke, and Richard Watson. All three were men of striking intellectual gifts, lofty character, and noble purpose, and the first named one of the greatest men in English history; yet we find them in geology hopelessly fettered by the mere letter of Scripture, and by a temporary phase in theology. As in regard to witchcraft and the doctrine of comets, so in regard to geology, this theological view drew Wesley into enormous error. The great doctrine which Wesley, Watson, Clarke, and their compeers, following St. Augustine, Bede, Peter Lombard, and a long line of the greatest minds in the universal Church, thought it especially necessary to uphold against geologists was, that death entered the world by sin by the first transgression of Adam and Eve. The extent to

which the supposed necessity of upholding this doctrine carried Wesley seems now almost beyond belief. Basing his theology on the declaration that the Almighty after creation found the earth and all created things "very good," he declares, in his sermon on the Cause and Cure of Earthquakes, that no one who believes the Scriptures can deny that "sin is the moral cause of earthquakes, whatever their natural cause may be." Again, he declares that earthquakes are the "effect of that curse which was brought upon the earth by the original transgression." Bringing into connection with Genesis the declaration of St. Paul that "the whole creation groaneth and travaileth together in pain until now," he finds additional scriptural proof that the earthquakes were the result of Adam's fall. He declares, in his sermon on God's Approbation of His Works, that "before the sin of Adam there were no agitations within the bowels of the earth, no violent convulsions, no concussions of the earth, no earthquakes, but all was unmoved as the pillars of heaven. There were then no such things

as eruptions of fires; no volcanoes or burning mountains." Of course, a science which showed that earthquakes had been in operation for ages before the appearance of man on the planet, and which showed, also, that those very earthquakes which he considered as curses resultant upon the Fall were really blessings, producing the fissures in which we find today those mineral veins so essential to modern civilization, was entirely beyond his comprehension. He insists that earthquakes are "God's strange works of judgment, the proper effect and punishment of sin."

So, too, as to death and pain. In his sermon on the Fall of Man he took the ground that death and pain entered the world by Adam's transgression, insisting that the carnage now going on among animals is the result of Adam's sin. Speaking of the birds, beasts, and insects, he says that, before sin entered the world by Adam's fall, "none of these attempted to devour or in any way hurt one another"; that "the spider was then as harmless as the fly and did not then

lie in wait for blood." Here, again, Wesley arrayed his early followers against geology, which reveals, in the fossil remains of carnivorous animals, pain and death countless ages before the appearance of man. The half digested fragments of weaker animals within the fossilized bodies of the stronger have destroyed all Wesley's arguments in behalf of his great theory.

Dr. Adam Clarke held similar views. He insisted that thorns and thistles were given as a curse to human labour, on account of Adam's sin, and appeared upon the earth for the first time after Adam's fall. So, too, Richard Watson, the most prolific writer of the great evangelical reform period, and the author of the Institutes, the standard theological treatise on the evangelical side, says, in a chapter treating of the Fall, and especially of the serpent which tempted Eve: "We have no reason at all to believe that the animal had a serpentine form in any mode or degree until his transformation. That he was then degraded to a reptile, to go upon his belly, imports, on the contrary, an entire

alteration and loss of the original form." All that admirable adjustment of the serpent to its environment which delights naturalists was to the Wesleyan divine simply an evil result of the sin of Adam and Eve. Yet here again geology was obliged to confront theology in revealing the PYTHON in the Eocene, ages before man appeared.

The immediate results of such teaching by such men was to throw many who would otherwise have resorted to observation and investigation back upon scholastic methods. Again reappears the old system of solving the riddle by phrases. In 1733, Dr. Theodore Arnold urged the theory of "models," and insisted that fossils result from "infinitesimal particles brought together in the creation to form the outline of all the creatures and objects upon and within the earth"; and Arnold's work gained wide acceptance.

Such was the influence of this succession of great men that toward the close of the last century the English opponents of geology on biblical grounds seemed likely to sweep all before them. Cramping our whole inheritance of

sacred literature within the rules of a historical compend, they showed the terrible dangers arising from the revelations of geology, which make the earth older than the six thousand years required by Archbishop Usher's interpretation of the Old Testament. Nor was this feeling confined to ecclesiastics. Williams, a thoughtful layman, declared that such researches led to infidelity and atheism, and are "nothing less than to depose the Almighty Creator of the universe from his office." The poet Cowper, one of the mildest of men, was also roused by these dangers, and in his most elaborate poem wrote:

"Some drill and bore The solid earth, and from the strata there Extract a register, by which we learn That He who made it, and revealed its date To Moses, was mistaken in its age!"

John Howard summoned England to oppose "those scientific systems which are calculated to tear up in the public mind every remaining attachment to Christianity."

With this special attack upon geological science by

means of the dogma of Adam's fall, the more general attack by the literal interpretation of the text was continued. The legendary husks and rinds of our sacred books were insisted upon as equally precious and nutritious with the great moral and religious truths which they envelop. Especially precious were the six days each "the evening and the morning" and the exact statements as to the time when each part of creation came into being. To save these, the struggle became more and more desperate.

Difficult as it is to realize it now, within the memory of many now living the battle was still raging most fiercely in England, and both kinds of artillery usually brought against a new science were in full play, and filling the civilized world with their roar.

About half a century since, the Rev. J. Mellor Brown, the Rev. Henry Cole, and others were hurling at all geologists alike, and especially at such Christian scholars as Dr. Buckland and Dean Conybeare and Pye Smith and Prof. Sedgwick, the epithets of "infidel," "impugner of the

sacred record," and "assailant of the volume of God."

The favourite weapon of the orthodox party was the charge that the geologists were "attacking the truth of God." They declared geology "not a subject of lawful inquiry," denouncing it as "a dark art," as "dangerous and disreputable," as "a forbidden province," as "infernal artillery," and as "an awful evasion of the testimony of revelation."

This attempt to scare men from the science having failed, various other means were taken. To say nothing about England, it is humiliating to human nature to remember the annoyances, and even trials, to which the pettiest and narrowest of men subjected such Christian scholars in our own country as Benjamin Silliman and Edward Hitchcock and Louis Agassiz.

But it is a duty and a pleasure to state here that one great Christian scholar did honour to religion and to himself by quietly accepting the claims of science and making the best of them, despite all these clamours. This

man was Nicholas Wiseman, better known afterward as Cardinal Wiseman. The conduct of this pillar of the Roman Catholic Church contrasts admirably with that of timid Protestants, who were filling England with shrieks and denunciations.

And here let it be noted that one of the most interesting skirmishes in this war occurred in New England. Prof. Stuart, of Andover, justly honoured as a Hebrew scholar, declared that to speak of six periods of time for the creation was flying in the face of Scripture; that Genesis expressly speaks of six days, each made up of "the evening and the morning," and not six periods of time.

To him replied a professor in Yale College, James Kingsley. In an article admirable for keen wit and kindly temper, he showed that Genesis speaks just as clearly of a solid firmament as of six ordinary days, and that, if Prof. Stuart had surmounted one difficulty and accepted the Copernican theory, he might as well get over another and accept the revelations of geology. The encounter was quick

and decisive, and the victory was with science and the broader scholarship of Yale.

Perhaps the most singular attempt against geology was made by a fine survival of the eighteenth century Don Dean Cockburn, of York to SCOLD its champions off the field. Having no adequate knowledge of the new science, he opened a battery of abuse, giving it to the world at large from the pulpit and through the press, and even through private letters. From his pulpit in York Minster he denounced Mary Somerville by name for those studies in physical geography which have made her name honoured throughout the world.

But the special object of his antipathy was the British Association for the Advancement of Science. He issued a pamphlet against it which went through five editions in two years, sent solemn warnings to its president, and in various ways made life a burden to Sedgwick, Buckland, and other eminent investigators who ventured to state geological facts as they found them.

These weapons were soon seen to be ineffective; they were like Chinese gongs and dragon lanterns against rifled cannon; the work of science went steadily on.

III. THE FIRST GREAT EFFORT AT COMPROMISE, BASED ON THE FLOOD OF NOAH.

Long before the end of the struggle already described, even at a very early period, the futility of the usual scholastic weapons had been seen by the more keen sighted champions of orthodoxy; and, as the difficulties of the ordinary attack upon science became more and more evident, many of these champions endeavoured to patch up a truce. So began the third stage in the war the period of attempts at compromise.

The position which the compromise party took was that the fossils were produced by the Deluge of Noah.

This position was strong, for it was apparently based upon Scripture. Moreover, it had high ecclesiastical sanction, some of the fathers having held that fossil remains,

even on the highest mountains, represented animals destroyed at the Deluge. Tertullian was especially firm on this point, and St. Augustine thought that a fossil tooth discovered in North Africa must have belonged to one of the giants mentioned in Scripture.

In the sixteenth century especially, weight began to be attached to this idea by those who felt the worthlessness of various scholastic explanations. Strong men in both the Catholic and the Protestant camps accepted it; but the man who did most to give it an impulse into modern theology was Martin Luther. He easily saw that scholastic phrase making could not meet the difficulties raised by fossils, and he naturally urged the doctrine of their origin at Noah's Flood.

With such support, it soon became the dominant theory in Christendom: nothing seemed able to stand against it; but before the end of the same sixteenth century it met some serious obstacles. Bernard Palissy, one of the most keen sighted of scientific thinkers in France, as well

as one of the most devoted of Christians, showed that it was utterly untenable. Conscientious investigators in other parts of Europe, and especially in Italy, showed the same thing; all in vain. In vain did good men protest against the injury sure to be brought upon religion by tying it to a scientific theory sure to be exploded; the doctrine that fossils are the remains of animals drowned at the Flood continued to be upheld by the great majority of theological leaders for nearly three centuries as "sound doctrine," and as a blessed means of reconciling science with Scripture. To sustain this scriptural view, efforts energetic and persistent were put forth both by Catholics and Protestants.

In France, the learned Benedictine, Calmet, in his great works on the Bible, accepted it as late as the beginning of the eighteenth century, believing the mastodon's bones exhibited by Mazurier to be those of King Teutobocus, and holding them valuable testimony to the existence of the giants mentioned in Scripture and of the early inhabitants of the earth overwhelmed by the

Flood.

But the greatest champion appeared in England. We have already seen how, near the close of the seventeenth century, Thomas Burnet prepared the way in his Sacred Theory of the Earth by rejecting the discoveries of Newton, and showing how sin led to the breaking up of the "foundations of the great deep," and we have also seen how Whiston, in his New Theory of the Earth, while yielding a little and accepting the discoveries of Newton, brought in a comet to aid in producing the Deluge; but far more important than these in permanent influence was John Woodward, professor at Gresham College, a leader in scientific thought at the University of Cambridge, and, as a patient collector of fossils and an earnest investigator of their meaning, deserving of the highest respect. In 1695 he published his Natural History of the Earth, and rendered one great service to science, for he yielded another point, and thus destroyed the foundations for the old theory of fossils. He showed that they were not "sports of Nature," or

"models inserted by the Creator in the strata for some inscrutable purpose," but that they were really remains of living beings, as Xenophanes had asserted two thousand years before him. So far, he rendered a great service both to science and religion; but, this done, the text of the Old Testament narrative and the famous passage in St. Peter's Epistle were too strong for him, and he, too, insisted that the fossils were produced by the Deluge. Aided by his great authority, the assault on the true scientific position was vigorous: Mazurier exhibited certain fossil remains of a mammoth discovered in France as bones of the giants mentioned in Scripture; Father Torrubia did the same thing in Spain; Increase Mather sent to England similar remains discovered in America, with a like statement.

For the edification of the faithful, such "bones of the giants mentioned in Scripture" were hung up in public places. Jurieu saw some of them thus suspended in one of the churches of Valence; and Henrion, apparently under the stimulus thus given, drew up tables showing the size of our

antediluvian ancestors, giving the height of Adam as 123 feet 9 inches and that of Eve as 118 feet 9 inches and 9 lines.

But the most brilliant service rendered to the theological theory came from another quarter for, in 1726, Scheuchzer, having discovered a large fossil lizard, exhibited it to the world as the "human witness of the Deluge": this great discovery was hailed everywhere with joy, for it seemed to prove not only that human beings were drowned at the Deluge, but that "there were giants in those days." Cheered by the applause thus gained, he determined to make the theological position impregnable. Mixing together various texts of Scripture with notions derived from the philosophy of Descartes and the speculations of Whiston, he developed the theory that "the fountains of the great deep" were broken up by the direct physical action of the hand of God, which, being literally applied to the axis of the earth, suddenly stopped the earth's rotation, broke up "the fountains of the great deep," spilled

the water therein contained, and produced the Deluge. But his service to sacred science did not end here, for he prepared an edition of the Bible, in which magnificent engravings in great number illustrated his view and enforced it upon all readers. Of these engravings no less than thirty four were devoted to the Deluge alone.

In the midst all this came an episode very comical but very instructive; for it shows that the attempt to shape the deductions of science to meet the exigencies of dogma may mislead heterodoxy as absurdly as orthodoxy.

About the year 1760 news of the discovery of marine fossils in various elevated districts of Europe reached Voltaire. He, too, had a theologic system to support, though his system was opposed to that of the sacred books of the Hebrews; and, fearing that these new discoveries might be used to support the Mosaic accounts of the Deluge, all his wisdom and wit were compacted into arguments to prove that the fossil fishes were remains of fishes intended for food, but spoiled and thrown away by travellers; that the

fossil shells were accidentally dropped by crusaders and pilgrims returning from the Holy Land; and that the fossil bones found between Paris and Etampes were parts of a skeleton belonging to the cabinet of some ancient philosopher. Through chapter after chapter, Voltaire, obeying the supposed necessities of his theology, fought desperately the growing results of the geologic investigations of his time.

But far more prejudicial to Christianity was the continued effort on the other side to show that the fossils were caused by the Deluge of Noah.

No supposition was too violent to support this theory, which was considered vital to the Bible. By taking the mere husks and rinds of biblical truth for truth itself, by taking sacred poetry as prose, and by giving a literal interpretation of it, the followers of Burnet, Whiston, and Woodward built up systems which bear to real geology much the same relation that the Christian Topography of Cosmas bears to real geography. In vain were exhibited the absolute

geological, zoological, astronomical proofs that no universal deluge, or deluge covering any large part of the earth, had taken place within the last six thousand or sixty thousand years; in vain did so enlightened a churchman as Bishop Clayton declare that the Deluge could not have extended beyond that district where Noah lived before the Flood; in vain did others, like Bishop Croft and Bishop Stillingfleet, and the nonconformist Matthew Poole, show that the Deluge might not have been and probably was not universal; in vain was it shown that, even if there had been a universal deluge, the fossils were not produced by it: the only answers were the citation of the text, "And all the high mountains which were under the whole heaven were covered," and, to clinch the matter, Worthington and men like him insisted that any argument to show that fossils were not remains of animals drowned at the Deluge of Noah was "infidelity." In England, France, and Germany, belief that the fossils were produced by the Deluge of Noah was widely insisted upon as part of that faith essential to

salvation.

But the steady work of science went on: not all the force of the Church not even the splendid engravings in Scheuchzer's Bible could stop it, and the foundations of this theological theory began to crumble away. The process was, indeed, slow; it required a hundred and twenty years for the searchers of God's truth, as revealed in Nature such men as Hooke, Linnaeus, Whitehurst, Daubenton, Cuvier, and William Smith to push their works under this fabric of error, and, by statements which could not be resisted, to undermine it. As we arrive at the beginning of the nineteenth century, science is becoming irresistible in this field. Blumenbach, Von Buch, and Schlotheim led the way, but most important on the Continent was the work of Cuvier. In the early years of the present century his researches among fossils began to throw new light into the whole subject of geology. He was, indeed, very conservative, and even more wary and diplomatic; seeming, like Voltaire, to feel that "among wolves one must howl a

little." It was a time of reaction. Napoleon had made peace with the Church, and to disturb that peace was akin to treason. By large but vague concessions Cuvier kept the theologians satisfied, while he undermined their strongest fortress. The danger was instinctively felt by some of the champions of the Church, and typical among these was Chateaubriand, who in his best known work, once so great, now so little the Genius of Christianity grappled with the questions of creation by insisting upon a sort of general deception "in the beginning," under which everything was created by a sudden fiat, but with appearances of pre existence. His words are as follows: "It was part of the perfection and harmony of the nature which was displayed before men's eyes that the deserted nests of last year's birds should be seen on the trees, and that the seashore should be covered with shells which had been the abode of fish, and yet the world was quite new, and nests and shells had never been inhabited." But the real victory was with Brongniart, who, about 1820, gave forth his work on fossil

plants, and thus built a barrier against which the enemies of science raged in vain.

Still the struggle was not ended, and, a few years later, a forlorn hope was led in England by Granville Penn.

His fundamental thesis was that "our globe has undergone only two revolutions, the Creation and the Deluge, and both by the immediate fiat of the Almighty"; he insisted that the Creation took place in exactly six days of ordinary time, each made up of "the evening and the morning"; and he ended with a piece of that peculiar presumption so familiar to the world, by calling on Cuvier and all other geologists to "ask for the old paths and walk therein until they shall simplify their system and reduce their numerous revolutions to the two events or epochs only the six days of Creation and the Deluge." The geologists showed no disposition to yield to this peremptory summons; on the contrary, the President of the British Geological Society, and even so eminent a churchman and geologist as Dean Buckland,

soon acknowledged that facts obliged them to give up the theory that the fossils of the coal measures were deposited at the Deluge of Noah, and to deny that the Deluge was universal.

The defection of Buckland was especially felt by the orthodox party. His ability, honesty, and loyalty to his profession, as well as his position as Canon of Christ Church and Professor of Geology at Oxford, gave him great authority, which he exerted to the utmost in soothing his brother ecclesiastics. In his inaugural lecture he had laboured to show that geology confirmed the accounts of Creation and the Flood as given in Genesis, and in 1823, after his cave explorations had revealed overwhelming evidences of the vast antiquity of the earth, he had still clung to the Flood theory in his Reliquiae Diluvianae.

This had not, indeed, fully satisfied the anti scientific party, but as a rule their attacks upon him took the form not so much of abuse as of humorous disparagement. An epigram by Shuttleworth, afterward Bishop of Chichester,

in imitation of Pope's famous lines upon Newton, ran as follows:

"Some doubts were once expressed about the Flood: Buckland arose, and all was clear as mud."

On his leaving Oxford for a journey to southern Europe, Dean Gaisford was heard to exclaim: "Well, Buckland is gone to Italy; so, thank God, we shall have no more of this geology!"

Still there was some comfort as long as Buckland held to the Deluge theory; but, on his surrender, the combat deepened: instead of epigrams and caricatures came bitter attacks, and from the pulpit and press came showers of missiles. The worst of these were hurled at Lyell. As we have seen, he had published in 1830 his Principles of Geology. Nothing could have been more cautious. It simply gave an account of the main discoveries up to that time, drawing the necessary inferences with plain yet convincing logic, and it remains to this day one of those works in which the Anglo Saxon race may most justly take pride,

one of the land marks in the advance of human thought.

But its tendency was inevitably at variance with the Chaldean and other ancient myths and legends regarding the Creation and Deluge which the Hebrews had received from the older civilizations among their neighbours, and had incorporated into the sacred books which they transmitted to the modern world; it was therefore extensively "refuted."

Theologians and men of science influenced by them insisted that his minimizing of geological changes, and his laying stress on the gradual action of natural causes still in force, endangered the sacred record of Creation and left no place for miraculous intervention; and when it was found that he had entirely cast aside their cherished idea that the great geological changes of the earth's surface and the multitude of fossil remains were due to the Deluge of Noah, and had shown that a far longer time was demanded for Creation than any which could possibly be deduced from the Old Testament genealogies and chronicles,

orthodox indignation burst forth violently; eminent dignitaries of the Church attacked him without mercy and for a time he was under social ostracism.

As this availed little, an effort was made on the scientific side to crush him beneath the weighty authority of Cuvier; but the futility of this effort was evident when it was found that thinking men would no longer listen to Cuvier and persisted in listening to Lyell. The great orthodox text book, Cuvier's Theory of the Earth, became at once so discredited in the estimation of men of science that no new edition of it was called for, while Lyell's work speedily ran through twelve editions and remained a firm basis of modern thought.

As typical of his more moderate opponents we may take Fairholme, who in 1837 published his Mosaic Deluge, and argued that no early convulsions of the earth, such as those supposed by geologists, could have taken place, because there could have been no deluge "before moral guilt could possibly have been incurred" that is to say,

before the creation of mankind. In touching terms he bewailed the defection of the President of the Geological Society and Dean Buckland protesting against geologists who "persist in closing their eyes upon the solemn declarations of the Almighty"

Still the geologists continued to seek truth: the germs planted especially by William Smith, "the Father of English Geology" were developed by a noble succession of investigators, and the victory was sure. Meanwhile those theologians who felt that denunciation of science as "godless" could accomplish little, laboured upon schemes for reconciling geology with Genesis. Some of these show amazing ingenuity, but an eminent religious authority, going over them with great thoroughness, has well characterized them as "daring and fanciful." Such attempts have been variously classified, but the fact regarding them all is that each mixes up more or less of science with more or less of Scripture, and produces a result more or less absurd. Though a few men here and there have continued

these exercises, the capitulation of the party which set the literal account of the Deluge of Noah against the facts revealed by geology was at last clearly made.

One of the first evidences of the completeness of this surrender has been so well related by the eminent physiologist, Dr. W. B. Carpenter, that it may best be given in his own words: "You are familiar with a book of considerable value, Dr. W. Smith's Dictionary of the Bible. I happened to know the influences under which that dictionary was framed. The idea of the publisher and of the editor was to give as much scholarship and such results of modern criticism as should be compatible with a very judicious conservatism. There was to be no objection to geology, but the universality of the Deluge was to be strictly maintained. The editor committed the article Deluge to a man of very considerable ability, but when the article came to him he found that it was so excessively heretical that he could not venture to put it in. There was not time for a second article under that head, and if you look in that

dictionary you will find under the word Deluge a reference to Flood. Before Flood came, a second article had been commissioned from a source that was believed safely conservative; but when the article came in it was found to be worse than the first. A third article was then commissioned, and care was taken to secure its 'safety.' If you look for the word Flood in the dictionary, you will find a reference to Noah. Under that name you will find an article written by a distinguished professor of Cambridge, of which I remember that Bishop Colenso said to me at the time, 'In a very guarded way the writer concedes the whole thing.' You will see by this under what trammels scientific thought has laboured in this department of inquiry."

A similar surrender was seen when from a new edition of Horne's Introduction to the Scriptures, the standard textbook of orthodoxy, its accustomed use of fossils to prove the universality of the Deluge was quietly dropped.

A like capitulation in the United States was

foreshadowed in 1841, when an eminent Professor of Biblical Literature and interpretation in the most important theological seminary of the Protestant Episcopal Church, Dr. Samuel Turner, showed his Christian faith and courage by virtually accepting the new view; and the old contention was utterly cast away by the thinking men of another great religious body when, at a later period, two divines among the most eminent for piety and learning in the Methodist Episcopal Church inserted in the Biblical Cyclopaedia, published under their supervision, a candid summary of the proofs from geology, astronomy, and zoology that the Deluge of Noah was not universal, or even widely extended, and this without protest from any man of note in any branch of the American Church.

The time when the struggle was relinquished by enlightened theologians of the Roman Catholic Church may be fixed at about 1862, when Reusch, Professor of Theology at Bonn, in his work on The Bible and Nature, cast off the old diluvial theory and all its supporters,

accepting the conclusions of science.

But, though the sacred theory with the Deluge of Noah as a universal solvent for geological difficulties was evidently dying, there still remained in various quarters a touching fidelity to it. In Roman Catholic countries the old theory was widely though quietly cherished, and taught from the religious press, the pulpit, and the theological professor's chair. Pope Pius IX was doubtless in sympathy with this feeling when, about 1850, he forbade the scientific congress of Italy to meet at Bologna.

In 1856 Father Debreyne congratulated the theologians of France on their admirable attitude: "Instinctively," he says, "they still insist upon deriving the fossils from Noah's Flood." In 1875 the Abbe Choyer published at Paris and Angers a text book widely approved by Church authorities, in which he took similar ground; and in 1877 the Jesuit father Bosizio published at Mayence a treatise on Geology and the Deluge, endeavouring to hold the world to the old solution of the problem,

allowing, indeed, that the "days" of Creation were long periods, but making atonement for this concession by sneers at Darwin.

In the Russo Greek Church, in 1869, Archbishop Macarius, of Lithuania, urged the necessity of believing that Creation in six days of ordinary time and the Deluge of Noah are the only causes of all that geology seeks to explain; and, as late as 1876, another eminent theologian of the same Church went even farther, and refused to allow the faithful to believe that any change had taken place since "the beginning" mentioned in Genesis, when the strata of the earth were laid, tilted, and twisted, and the fossils scattered among them by the hand of the Almighty during six ordinary days.

In the Lutheran branch of the Protestant Church we also find echoes of the old belief. Keil, eminent in scriptural interpretation at the University of Dorpat, gave forth in 1860 a treatise insisting that geology is rendered futile and its explanations vain by two great facts: the Curse

which drove Adam and Eve out of Eden, and the Flood that destroyed all living things save Noah, his family, and the animals in the ark. In 1867, Phillippi, and in 1869, Dieterich, both theologians of eminence, took virtually the same ground in Germany, the latter attempting to beat back the scientific hosts with a phrase apparently pithy, but really hollow the declaration that "modern geology observes what is, but has no right to judge concerning the beginning of things." As late as 1876, Zugler took a similar view, and a multitude of lesser lights, through pulpit and press, brought these antiscientific doctrines to bear upon the people at large the only effect being to arouse grave doubts regarding Christianity among thoughtful men, and especially among young men, who naturally distrusted a cause using such weapons.

For just at this time the traditional view of the Deluge received its death blow, and in a manner entirely unexpected. By the investigations of George Smith among the Assyrian tablets of the British Museum, in 1872, and by

his discoveries just afterward in Assyria, it was put beyond a reasonable doubt that a great mass of accounts in Genesis are simply adaptations of earlier and especially of Chaldean myths and legends. While this proved to be the fact as regards the accounts of Creation and the fall of man, it was seen to be most strikingly so as regards the Deluge. The eleventh of the twelve tablets, on which the most important of these inscriptions was found, was almost wholly preserved, and it revealed in this legend, dating from a time far earlier than that of Moses, such features peculiar to the childhood of the world as the building of the great ship or ark to escape the flood, the careful caulking of its seams, the saving of a man beloved of Heaven, his selecting and taking with him into the vessel animals of all sorts in couples, the impressive final closing of the door, the sending forth different birds as the flood abated, the offering of sacrifices when the flood had subsided, the joy of the Divine Being who had caused the flood as the odour of the sacrifice reached his nostrils; while throughout all

was shown that partiality for the Chaldean sacred number seven which appears so constantly in the Genesis legends and throughout the Hebrew sacred books.

Other devoted scholars followed in the paths thus opened Sayce in England, Lenormant in France, Schrader in Germany with the result that the Hebrew account of the Deluge, to which for ages theologians had obliged all geological research to conform, was quietly relegated, even by most eminent Christian scholars, to the realm of myth and legend.

Sundry feeble attempts to break the force of this discovery, and an evidently widespread fear to have it known, have certainly impaired not a little the legitimate influence of the Christian clergy.

And yet this adoption of Chaldean myths into the Hebrew Scriptures furnishes one of the strongest arguments for the value of our Bible as a record of the upward growth of man; for, while the Chaldean legend primarily ascribes the Deluge to the mere arbitrary caprice of one among

many gods (Bel), the Hebrew development of the legend ascribes it to the justice, the righteousness, of the Supreme God; thus showing the evolution of a higher and nobler sentiment which demanded a moral cause adequate to justify such a catastrophe.

Unfortunately, thus far, save in a few of the broader and nobler minds among the clergy, the policy of ignoring such new revelations has prevailed, and the results of this policy, both in Roman Catholic and in Protestant countries, are not far to seek. What the condition of thought is among the middle classes of France and Italy needs not to be stated here. In Germany, as a typical fact, it may be mentioned that there was in the year 1881 church accommodation in the city of Berlin for but two per cent of the population, and that even this accommodation was more than was needed. This fact is not due to the want of a deep religious spirit among the North Germans: no one who has lived among them can doubt the existence of such a spirit; but it is due mainly to the fact that, while the simple results of scientific

investigation have filtered down among the people at large, the dominant party in the Lutheran Church has steadily refused to recognise this fact, and has persisted in imposing on Scripture the fetters of literal and dogmatic interpretation which Germany has largely outgrown. A similar danger threatens every other country in which the clergy pursue a similar policy. No thinking man, whatever may be his religious views, can fail to regret this. A thoughtful, reverent, enlightened clergy is a great blessing to any country, and anything which undermines their legitimate work of leading men out of the worship of material things to the consideration of that which is highest is a vast misfortune.

IV. FINAL EFFORTS AT COMPROMISE. THE VICTORY OF SCIENCE COMPLETE.

Before concluding, it may be instructive to note a few especially desperate attempts at truces or compromises, such as always appear when the victory of any science has become absolutely sure. Typical among the earliest of these may be mentioned the effort of Carl von Raumer in 1819. With much pretension to scientific knowledge, but with aspirations bounded by the limits of Prussian orthodoxy, he made a laboured attempt to produce a statement which, by its vagueness, haziness, and "depth," should obscure the real questions at issue. This statement appeared in the shape of an argument, used by Bertrand and others in the previous century, to prove that fossil remains of plants in the coal measures had never existed as living plants, but had been simply a "result of the development of imperfect plant embryos"; and the same misty theory was suggested to explain the existence of fossil animals without supposing

the epochs and changes required by geological science.

In 1837 Wagner sought to uphold this explanation; but it was so clearly a mere hollow phrase, unable to bear the weight of the facts to be accounted for, that it was soon given up.

Similar attempts were made throughout Europe, the most noteworthy appearing in England. In 1853 was issued an anonymous work having as its title A Brief and Complete Refutation of the Anti Scriptural Theory of Geologists: the author having revived an old idea, and put a spark of life into it this idea being that "all the organisms found in the depths of the earth were made on the first of the six creative days, as models for the plants and animals to be created on the third, fifth, and sixth days."

But while these attempts to preserve the old theory as to fossil remains of lower animals were thus pressed, there appeared upon the geological field a new scientific column far more terrible to the old doctrines than any which had been seen previously.

For, just at the close of the first quarter of the nineteenth century, geologists began to examine the caves and beds of drift in various parts of the world; and within a few years from that time a series of discoveries began in France, in Belgium, in England, in Brazil, in Sicily, in India, in Egypt, and in America, which established the fact that a period of time much greater than any which had before been thought of had elapsed since the first human occupation of the earth. The chronologies of Archbishop Usher, Petavius, Bossuet, and the other great authorities on which theology had securely leaned, were found worthless. It was clearly seen that, no matter how well based upon the Old Testament genealogies and lives of the patriarchs, all these systems must go for nothing. The most conservative geologists were gradually obliged to admit that man had been upon the earth not merely six thousand, or sixty thousand, or one hundred and sixty thousand years. And when, in 1863, Sir Charles Lyell, in his book on The Antiquity of Man, retracted solemnly his earlier view

yielding with a reluctance almost pathetic, but with a thoroughness absolutely convincing the last stronghold of orthodoxy in this field fell.

The supporters of a theory based upon the letter of Scripture, who had so long taken the offensive, were now obliged to fight upon the defensive and at fearful odds. Various lines of defence were taken; but perhaps the most pathetic effort was that made in the year 1857, in England, by Gosse. As a naturalist he had rendered great services to zoological science, but he now concentrated his energies upon one last effort to save the literal interpretation of Genesis and the theological structure built upon it. In his work entitled Omphalos he developed the theory previously urged by Granville Penn, and asserted a new principle called "prochronism." In accordance with this, all things were created by the Almighty hand literally within the six days, each made up of "the evening and the morning," and each great branch of creation was brought into existence in an instant. Accepting a declaration of Dr. Ure,

that "neither reason nor revelation will justify us in extending the origin of the material system beyond six thousand years from our own days," Gosse held that all the evidences of convulsive changes and long epochs in strata, rocks, minerals, and fossils are simply "APPEARANCES" only that and nothing more. Among these mere "appearances," all created simultaneously, were the glacial furrows and scratches on rocks, the marks of retreat on rocky masses, as at Niagara, the tilted and twisted strata, the piles of lava from extinct volcanoes, the fossils of every sort in every part of the earth, the foot tracks of birds and reptiles, the half digested remains of weaker animals found in the fossilized bodies of the stronger, the marks of hyenas' teeth on fossilized bones found in various caves, and even the skeleton of the Siberian mammoth at St. Petersburg with lumps of flesh bearing the marks of wolves' teeth all these, with all gaps and imperfections, he urged mankind to believe came into being in an instant. The preface of the work is especially touching, and it ends with the prayer that

science and Scripture may be reconciled by his theory, and "that the God of truth will deign so to use it, and if he do, to him be all the glory." At the close of the whole book Gosse declared: "The field is left clear and undisputed for the one witness on the opposite side, whose testimony is as follows: ‘In six days Jehovah made heaven and earth, the sea, and all that in them is.’" This quotation he placed in capital letters, as the final refutation of all that the science of geology had built.

In other parts of Europe desperate attempts were made even later to save the letter of our sacred books by the revival of a theory in some respects more striking. To shape this theory to recent needs, vague reminiscences of a text in Job regarding fire beneath the earth, and vague conceptions of speculations made by Humboldt and Laplace, were mingled with Jewish tradition. Out of the mixture thus obtained Schubert developed the idea that the Satanic "principalities and powers" formerly inhabiting our universe plunged it into the chaos from which it was

newly created by a process accurately described in Genesis. Rougemont made the earth one of the "morning stars" of Job, reduced to chaos by Lucifer and his followers, and thence developed in accordance with the nebular hypothesis. Kurtz evolved from this theory an opinion that the geological disturbances were caused by the opposition of the devil to the rescue of our universe from chaos by the Almighty. Delitzsch put a similar idea into a more scholastic jargon; but most desperate of all were the statements of Dr. Anton Westermeyer, of Munich, in The Old Testament vindicated from Modern Infidel Objections. The following passage will serve to show his ideas: "By the fructifying brooding of the Divine Spirit on the waters of the deep, creative forces began to stir; the devils who inhabited the primeval darkness and considered it their own abode saw that they were to be driven from their possessions, or at least that their place of habitation was to be contracted, and they therefore tried to frustrate God's plan of creation and exert all that remained to them of

might and power to hinder or at least to mar the new creation." So came into being "the horrible and destructive monsters, these caricatures and distortions of creation," of which we have fossil remains. Dr. Westermeyer goes on to insist that "whole generations called into existence by God succumbed to the corruption of the devil, and for that reason had to be destroyed"; and that "in the work of the six days God caused the devil to feel his power in all earnest, and made Satan's enterprise appear miserable and vain."

Such was the last important assault upon the strongholds of geological science in Germany; and, in view of this and others of the same kind, it is little to be wondered at that when, in 1870, Johann Silberschlag made an attempt to again base geology upon the Deluge of Noah, he found such difficulties that, in a touching passage, he expressed a desire to get back to the theory that fossils were "sports of Nature."

But the most noted among efforts to keep geology

well within the letter of Scripture is of still more recent date. In the year 1885 Mr. Gladstone found time, amid all his labours and cares as the greatest parliamentary leader in England, to take the field in the struggle for the letter of Genesis against geology.

On the face of it his effort seemed Quixotic, for he confessed at the outset that in science he was "utterly destitute of that kind of knowledge which carries authority," and his argument soon showed that this confession was entirely true.

But he had some other qualities of which much might be expected: great skill in phrase making, great shrewdness in adapting the meanings of single words to conflicting necessities in discussion, wonderful power in erecting showy structures of argument upon the smallest basis of fact, and a facility almost preternatural in "explaining away" troublesome realities. So striking was his power in this last respect, that a humorous London chronicler once advised a bigamist, as his only hope, to induce Mr.

Gladstone to explain away one of his wives.

At the basis of this theologico geological structure Mr. Gladstone placed what he found in the text of Genesis: "A grand fourfold division" of animated Nature "set forth in an orderly succession of times." And he arranged this order and succession of creation as follows: "First, the water population; secondly, the air population; thirdly, the land population of animals; fourthly, the land population consummated in man."

His next step was to slide in upon this basis the apparently harmless proposition that this division and sequence "is understood to have been so affirmed in our time by natural science that it may be taken as a demonstrated conclusion and established fact."

Finally, upon these foundations he proceeded to build an argument out of the coincidences thus secured between the record in the Hebrew sacred books and the truths revealed by science as regards this order and sequence, and he easily arrived at the desired conclusion with which he

crowned the whole structure, namely, as regards the writer of Genesis, that "his knowledge was divine."

Such was the skeleton of the structure; it was abundantly decorated with the rhetoric in which Mr. Gladstone is so skilful an artificer, and it towered above "the average man" as a structure beautiful and invincible like some Chinese fortress in the nineteenth century, faced with porcelain and defended with crossbows.

Its strength was soon seen to be unreal. In an essay admirable in its temper, overwhelming in its facts, and absolutely convincing in its argument, Prof. Huxley, late President of the Royal Society, and doubtless the most eminent contemporary authority on the scientific questions concerned, took up the matter.

Mr. Gladstone’s first proposition, that the sacred writings give us a great "fourfold division" created "in an orderly succession of times," Prof. Huxley did not presume to gainsay.

As to Mr. Gladstone’s second proposition, that "this

great fourfold division created in an orderly succession of times has been so affirmed in our own time by natural science that it may be taken as a demonstrated conclusion and established fact," Prof. Huxley showed that, as a matter of fact, no such "fourfold division" and "orderly succession" exist; that, so far from establishing Mr. Gladstone's assumption that the population of water, air, and land followed each other in the order given, "all the evidence we possess goes to prove that they did not"; that the distribution of fossils through the various strata proves that some land animals originated before sea animals; that there has been a mixing of sea, land, and air "population" utterly destructive to the "great fourfold division" and to the creation "in an orderly succession of times"; that, so far is the view presented in the sacred text, as stated by Mr. Gladstone, from having been "so affirmed in our own time by natural science, that it may be taken as a demonstrated conclusion and established fact" that Mr. Gladstone's assertion is "directly contradictory to facts

known to every one who is acquainted with the elements of natural science"; that Mr. Gladstone's only geological authority, Cuvier, had died more than fifty years before, when geological science was in its infancy (and he might have added, when it was necessary to make every possible concession to the Church); and, finally, he challenged Mr. Gladstone to produce any contemporary authority in geological science who would support his so called scriptural view. And when, in a rejoinder, Mr. Gladstone attempted to support his view on the authority of Prof. Dana, Prof. Huxley had no difficulty in showing from Prof. Dana's works that Mr. Gladstone's inference was utterly unfounded. But, while the fabric reared by Mr. Gladstone had been thus undermined by Huxley on the scientific side, another opponent began an attack from the biblical side. The Rev. Canon Driver, professor at Mr. Gladstone's own University of Oxford, took up the question in the light of scriptural interpretation. In regard to the comparative table drawn up

by Sir J. W. Dawson, showing the supposed correspondence between the scriptural and the geological order of creation, Canon Driver said: "The two series are evidently at variance. The geological record contains no evidence of clearly defined periods corresponding to the ‘days’ of Genesis. In Genesis, vegetation is complete two days before animal life appears. Geology shows that they appear simultaneously even if animal life does not appear first. In Genesis, birds appear together with aquatic creatures, and precede all land animals; according to the evidence of geology, birds are unknown till a period much later than that at which aquatic creatures (including fishes and amphibia) abound, and they are preceded by numerous species of land animals in particular, by insects and other ‘creeping things.’" Of the Mosaic account of the existence of vegetation before the creation of the sun, Canon Driver said, "No reconciliation of this representation with the data of science has yet been found"; and again: "From all that has been said, however reluctant we may be to make the

admission, only one conclusion seems possible. Read without prejudice or bias, the narrative of Genesis i, creates an impression at variance with the facts revealed by science." The eminent professor ends by saying that the efforts at reconciliation are "different modes of obliterating the characteristic features of Genesis, and of reading into it a view which it does not express."

Thus fell Mr. Gladstone's fabric of coincidences between the "great fourfold division" in Genesis and the facts ascertained by geology. Prof. Huxley had shattered the scientific parts of the structure, Prof. Driver had removed its biblical foundations, and the last great fortress of the opponents of unfettered scientific investigation was in ruins.

In opposition to all such attempts we may put a noble utterance by a clergyman who has probably done more to save what is essential in Christianity among English speaking people than any other ecclesiastic of his time. The late Dean of Westminster, Dr. Arthur Stanley, was widely

known and beloved on both continents. In his memorial sermon after the funeral of Sir Charles Lyell he said: "It is now clear to diligent students of the Bible that the first and second chapters of Genesis contain two narratives of the creation side by side, differing from each other in almost every particular of time and place and order. It is well known that, when the science of geology first arose, it was involved in endless schemes of attempted reconciliation with the letter of Scripture. There were, there are perhaps still, two modes of reconciliation of Scripture and science, which have been each in their day attempted, AND EACH HAS TOTALLY AND DESERVEDLY FAILED. One is the endeavour to wrest the words of the Bible from their natural meaning and FORCE IT TO SPEAK THE LANGUAGE OF SCIENCE." And again, speaking of the earliest known example, which was the interpolation of the word "not" in Leviticus xi, 6, he continues: "This is the earliest instance of THE FALSIFICATION OF SCRIPTURE TO MEET THE DEMANDS OF

SCIENCE; and it has been followed in later times by the various efforts which have been made to twist the earlier chapters of the book of Genesis into APPARENT agreement with the last results of geology representing days not to be days, morning and evening not to be morning and evening, the Deluge not to be the Deluge, and the ark not to be the ark."

After a statement like this we may fitly ask, Which is the more likely to strengthen Christianity for its work in the twentieth century which we are now about to enter a large, manly, honest, fearless utterance like this of Arthur Stanley, or hair splitting sophistries, bearing in their every line the germs of failure, like those attempted by Mr. Gladstone?

The world is finding that the scientific revelation of creation is ever more and more in accordance with worthy conceptions of that great Power working in and through the universe. More and more it is seen that inspiration has never ceased, and that its prophets and priests are not those who work to fit the letter of its older literature to the needs

of dogmas and sects, but those, above all others, who patiently, fearlessly, and reverently devote themselves to the search for truth as truth, in the faith that there is a Power in the universe wise enough to make truth seeking safe and good enough to make truth telling useful.

CHAPTER VI. THE ANTIQUITY OF MAN

EGYPTOLOGY, AND ASSYRIOLOGY.

I. THE SACRED CHRONOLOGY.

In the great ranges of investigation which bear most directly upon the origin of man, there are two in which Science within the last few years has gained final victories. The significance of these in changing, and ultimately in reversing, one of the greatest currents of theological thought, can hardly be overestimated; not even the tide set in motion by Cusa, Copernicus, and Galileo was more powerful to bring in a new epoch of belief.

The first of these conquests relates to the antiquity of

man on the earth.

The fathers of the early Christian Church, receiving all parts of our sacred books as equally inspired, laid little, if any, less stress on the myths, legends, genealogies, and tribal, family, and personal traditions contained in the Old and the New Testaments, than upon the most powerful appeals, the most instructive apologues, and the most lofty poems of prophets, psalmists, and apostles. As to the age of our planet and the life of man upon it, they found in the Bible a carefully recorded series of periods, extending from Adam to the building of the Temple at Jerusalem, the length of each period being explicitly given.

Thus they had a biblical chronology full, consecutive, and definite extending from the first man created to an event of known date well within ascertained profane history; as a result, the early Christian commentators arrived at conclusions varying somewhat, but in the main agreeing. Some, like Origen, Eusebius, Lactantius, Clement of Alexandria, and the great fathers generally of the first three

centuries, dwelling especially upon the Septuagint version of the Scriptures, thought that man's creation took place about six thousand years before the Christian era. Strong confirmation of this view was found in a simple piece of purely theological reasoning: for, just as the seven candlesticks of the Apocalypse were long held to prove the existence of seven heavenly bodies revolving about the earth, so it was felt that the six days of creation prefigured six thousand years during which the earth in its first form was to endure; and that, as the first Adam came on the sixth day, Christ, the second Adam, had come at the sixth millennial period. Theophilus, Bishop of Antioch, in the second century clinched this argument with the text, "One day is with the Lord as a thousand years."

On the other hand, Eusebius and St. Jerome, dwelling more especially upon the Hebrew text, which we are brought up to revere, thought that man's origin took place at a somewhat shorter period before the Christian era; and St. Jerome's overwhelming authority made this the dominant

view throughout western Europe during fifteen centuries.

The simplicity of these great fathers as regards chronology is especially reflected from the tables of Eusebius. In these, Moses, Joshua, and Bacchus, Deborah, Orpheus, and the Amazons, Abimelech, the Sphinx, and Oedipus, appear together as personages equally real, and their positions in chronology equally ascertained.

At times great bitterness was aroused between those holding the longer and those holding the shorter chronology, but after all the difference between them, as we now see, was trivial; and it may be broadly stated that in the early Church, "always, everywhere, and by all," it was held as certain, upon the absolute warrant of Scripture, that man was created from four to six thousand years before the Christian era.

To doubt this, and even much less than this, was to risk damnation. St. Augustine insisted that belief in the antipodes and in the longer duration of the earth than six thousand years were deadly heresies, equally hostile to

Scripture. Philastrius, the friend of St. Ambrose and St. Augustine, whose fearful catalogue of heresies served as a guide to intolerance throughout the Middle Ages, condemned with the same holy horror those who expressed doubt as to the orthodox number of years since the beginning of the world, and those who doubted an earthquake to be the literal voice of an angry God, or who questioned the plurality of the heavens, or who gainsaid the statement that God brings out the stars from his treasures and hangs them up in the solid firmament above the earth every night.

About the beginning of the seventh century Isidore of Seville, the great theologian of his time, took up the subject. He accepted the dominant view not only of Hebrew but of all other chronologies, without anything like real criticism. The childlike faith of his system may be imagined from his summaries which follow. He tells us:

"Joseph lived one hundred and five years. Greece began to cultivate grain."

"The Jews were in slavery in Egypt one hundred and forty four years. Atlas discovered astrology."

"Joshua ruled for twenty seven years. Ericthonius yoked horses together."

"Othniel, forty years. Cadmus introduced letters into Greece."

"Deborah, forty years. Apollo discovered the art of medicine and invented the cithara."

"Gideon, forty years. Mercury invented the lyre and gave it to Orpheus."

Reasoning in this general way, Isidore kept well under the longer date; and, the great theological authority of southern Europe having thus spoken, the question was virtually at rest throughout Christendom for nearly a hundred years.

Early in the eighth century the Venerable Bede took up the problem. Dwelling especially upon the received Hebrew text of the Old Testament, he soon entangled himself in very serious difficulties; but, in spite of the great

fathers of the first three centuries, he reduced the antiquity of man on the earth by nearly a thousand years, and, in spite of mutterings against him as coming dangerously near a limit which made the theological argument from the six days of creation to the six ages of the world look doubtful, his authority had great weight, and did much to fix western Europe in its allegiance to the general system laid down by Eusebius and Jerome.

In the twelfth century this belief was re enforced by a tide of thought from a very different quarter. Rabbi Moses Maimonides and other Jewish scholars, by careful study of the Hebrew text, arrived at conclusions diminishing the antiquity of man still further, and thus gave strength throughout the Middle Ages to the shorter chronology: it was incorporated into the sacred science of Christianity; and Vincent of Beauvais, in his great Speculum Historiale, forming part of that still more enormous work intended to sum up all the knowledge possessed by the ages of faith, placed the creation of man at about four thousand

years before our era.

At the Reformation this view was not disturbed. The same manner of accepting the sacred text which led Luther, Melanchthon, and the great Protestant leaders generally, to oppose the Copernican theory, fixed them firmly in this biblical chronology; the keynote was sounded for them by Luther when he said, "We know, on the authority of Moses, that longer ago than six thousand years the world did not exist." Melanchthon, more exact, fixed the creation of man at 3963 B.C.

But the great Christian scholars continued the old endeavour to make the time of man's origin more precise: there seems to have been a sort of fascination in the subject which developed a long array of chronologists, all weighing the minutest indications in our sacred books, until the Protestant divine De Vignolles, who had given forty years to the study of biblical chronology, declared in 1738 that he had gathered no less than two hundred computations based upon Scripture, and no two alike.

As to the Roman Church, about 1580 there was published, by authority of Pope Gregory XIII, the Roman Martyrology, and this, both as originally published and as revised in 1640 under Pope Urban VIII, declared that the creation of man took place 5199 years before Christ.

But of all who gave themselves up to these chronological studies, the man who exerted the most powerful influence upon the dominant nations of Christendom was Archbishop Usher. In 1650 he published his Annals of the Ancient and New Testaments, and it at once became the greatest authority for all English speaking peoples. Usher was a man of deep and wide theological learning, powerful in controversy; and his careful conclusion, after years of the most profound study of the Hebrew Scriptures, was that man was created 4004 years before the Christian era. His verdict was widely received as final; his dates were inserted in the margins of the authorized version of the English Bible, and were soon practically regarded as equally inspired with the

sacred text itself: to question them seriously was to risk preferment in the Church and reputation in the world at large.

The same adhesion to the Hebrew Scriptures which had influenced Usher brought leading men of the older Church to the same view: men who would have burned each other at the stake for their differences on other points, agreed on this: Melanchthon and Tostatus, Lightfoot and Jansen, Salmeron and Scaliger, Petavius and Kepler, inquisitors and reformers, Jesuits and Jansenists, priests and rabbis, stood together in the belief that the creation of man was proved by Scripture to have taken place between 3900 and 4004 years before Christ.

In spite of the severe pressure of this line of authorities, extending from St. Jerome and Eusebius to Usher and Petavius, in favour of this scriptural chronology, even devoted Christian scholars had sometimes felt obliged to revolt. The first great source of difficulty was increased knowledge regarding the Egyptian monuments. As far back

as the last years of the sixteenth century Joseph Scaliger had done what he could to lay the foundations of a more scientific treatment of chronology, insisting especially that the historical indications in Persia, in Babylon, and above all in Egypt, should be brought to bear on the question. More than that, he had the boldness to urge that the chronological indications of the Hebrew Scriptures should be fully and critically discussed in the light of Egyptian and other records, without any undue bias from theological considerations. His idea may well be called inspired; yet it had little effect as regards a true view of the antiquity of man, even upon himself, for the theological bias prevailed above all his reasonings, even in his own mind. Well does a brilliant modern writer declare that, "among the multitude of strong men in modern times abdicating their reason at the command of their prejudices, Joseph Scaliger is perhaps the most striking example." Early in the following century Sir Walter Raleigh, in his History of the World (1603-1616), pointed out the danger of adhering to the old system. He,

too, foresaw one of the results of modern investigation, stating it in these words, which have the ring of prophetic inspiration: "For in Abraham's time all the then known parts of the world were developed Egypt had many magnificent cities, and these not built with sticks, but of hewn stone, which magnificence needed a parent of more antiquity than these other men have supposed." In view of these considerations Raleigh followed the chronology of the Septuagint version, which enabled him to give to the human race a few more years than were usually allowed.

About the middle of the seventeenth century Isaac Vossius, one of the most eminent scholars of Christendom, attempted to bring the prevailing belief into closer accordance with ascertained facts, but, save by a chosen few, his efforts were rejected. In some parts of Europe a man holding new views on chronology was by no means safe from bodily harm. As an example of the extreme pressure exerted by the old theological system at times upon honest scholars, we may take the case of La

Peyrere, who about the middle of the seventeenth century put forth his book on the Pre Adamites an attempt to reconcile sundry well known difficulties in Scripture by claiming that man existed on earth before the time of Adam. He was taken in hand at once; great theologians rushed forward to attack him from all parts of Europe; within fifty years thirty six different refutations of his arguments had appeared; the Parliament of Paris burned the book, and the Grand Vicar of the archdiocese of Mechlin threw him into prison and kept him there until he was forced, not only to retract his statements, but to abjure his Protestantism.

In England, opposition to the growing truth was hardly less earnest. Especially strong was Pearson, afterward Master of Trinity and Bishop of Chester. In his treatise on the Creed, published in 1659, which has remained a theologic classic, he condemned those who held the earth to be more than fifty six hundred years old, insisted that the first man was created just six days later, declared that the Egyptian records were forged, and called all Christians to

turn from them to "the infallible annals of the Spirit of God."

But, in spite of warnings like these, we see the new idea cropping out in various parts of Europe. In 1672, Sir John Marsham published a work in which he showed himself bold and honest. After describing the heathen sources of Oriental history, he turns to the Christian writers, and, having used the history of Egypt to show that the great Church authorities were not exact, he ends one important argument with the following words: "Thus the most interesting antiquities of Egypt have been involved in the deepest obscurity by the very interpreters of her chronology, who have jumbled everything up (qui omnia susque deque permiscuerunt), so as to make them match with their own reckonings of Hebrew chronology. Truly a very bad example, and quite unworthy of religious writers."

This sturdy protest of Sir John against the dominant system and against the "jumbling" by which Eusebius had endeavoured to cut down ancient chronology within safe

and sound orthodox limits, had little effect. Though eminent chronologists of the eighteenth century, like Jackson, Hales, and Drummond, gave forth multitudes of ponderous volumes pleading for a period somewhat longer than that generally allowed, and insisting that the received Hebrew text was grossly vitiated as regards chronology, even this poor favour was refused them; the mass of believers found it more comfortable to hold fast the faith committed to them by Usher, and it remained settled that man was created about four thousand years before our era.

To those who wished even greater precision, Dr. John Lightfoot, Vice Chancellor of the University of Cambridge, the great rabbinical scholar of his time, gave his famous demonstration from our sacred books that "heaven and earth, centre and circumference, were created together, in the same instant, and clouds full of water," and that "this work took place and man was created by the Trinity on the twenty third of October, 4004 B.C., at nine o'clock in the

morning."

This tide of theological reasoning rolled on through the eighteenth century, swollen by the biblical researches of leading commentators, Catholic and Protestant, until it came in much majesty and force into our own nineteenth century. At the very beginning of the century it gained new strength from various great men in the Church, among whom may be especially named Dr. Adam Clarke, who declared that, "to preclude the possibility of a mistake, the unerring Spirit of God directed Moses in the selection of his facts and the ascertaining of his dates."

All opposition to the received view seemed broken down, and as late as 1835 indeed, as late as 1850 came an announcement in the work of one of the most eminent Egyptologists, Sir J. G. Wilkinson, to the effect that he had modified the results he had obtained from Egyptian monuments, in order that his chronology might not interfere with the received date of the Deluge of Noah.

II. THE NEW CHRONOLOGY.

But all investigators were not so docile as Wilkinson, and there soon came a new train of scientific thought which rapidly undermined all this theological chronology. Not to speak of other noted men, we have early in the present century Young, Champollion, and Rosellini, beginning a new epoch in the study of the Egyptian monuments. Nothing could be more cautious than their procedure, but the evidence was soon overwhelming in favour of a vastly longer existence of man in the Nile Valley than could be made to agree with even the longest duration then allowed by theologians. For, in spite of all the suppleness of men like Wilkinson, it became evident that, whatever system of scriptural chronology was adopted, Egypt was the seat of a flourishing civilization at a period before the "Flood of Noah," and that no such flood had ever interrupted it. This was bad, but worse remained behind: it was soon clear that the civilization of Egypt began earlier than the time

assigned for the creation of man, even according to the most liberal of the sacred chronologists.

As time went on, this became more and more evident. The long duration assigned to human civilization in the fragments of Manetho, the Egyptian scribe at Thebes in the third century B.C., was discovered to be more accordant with truth than the chronologies of the great theologians; and, as the present century has gone on, scientific results have been reached absolutely fatal to the chronological view based by the universal Church upon Scripture for nearly two thousand years.

As is well known, the first of the Egyptian kings of whom mention is made upon the monuments of the Nile Valley is Mena, or Menes. Manetho had given a statement, according to which Mena must have lived nearly six thousand years before the Christian era. This was looked upon for a long time as utterly inadmissible, as it was so clearly at variance with the chronology of our own sacred books; but, as time went on, large fragments of the

original work of Manetho were more carefully studied and distinguished from corrupt transcriptions, the lists of kings at Karnak, Sacquarah, and the two temples at Abydos were brought to light, and the lists of court architects were discovered. Among all these monuments the scholar who visits Egypt is most impressed by the sculptured tablets giving the lists of kings. Each shows the monarch of the period doing homage to the long line of his ancestors. Each of these sculptured monarchs has near him a tablet bearing his name. That great care was always taken to keep these imposing records correct is certain; the loyalty of subjects, the devotion of priests, and the family pride of kings were all combined in this; and how effective this care was, is seen in the fact that kings now known to be usurpers are carefully omitted. The lists of court architects, extending over the period from Seti to Darius, throw a flood of light over the other records.

Comparing, then, all these sources, and applying an average from the lengths of the long series of well known

reigns to the reigns preceding, the most careful and cautious scholars have satisfied themselves that the original fragments of Manetho represent the work of a man honest and well informed, and, after making all allowances for discrepancies and the overlapping of reigns, it has become clear that the period known as the reign of Mena must be fixed at more than three thousand years B.C. In this the great Egyptologists of our time concur. Mariette, the eminent French authority, puts the date at 5004 B.C.; Brugsch, the leading German authority, puts it at about 4500 B.C.; and Meyer, the latest and most cautious of the historians of antiquity, declares 3180 B.C. the latest possible date that can be assigned it. With these dates the foremost English authorities, Sayce and Flinders Petrie, substantially agree. This view is also confirmed on astronomical grounds by Mr. Lockyer, the Astronomer Royal. We have it, then, as the result of a century of work by the most acute and trained Egyptologists, and with the inscriptions upon the temples and papyri before them, both

of which are now read with as much facility as many medieval manuscripts, that the reign of Mena must be placed more than five thousand years ago.

But the significance of this conclusion can not be fully understood until we bring into connection with it some other facts revealed by the Egyptian monuments.

The first of these is that which struck Sir Walter Raleigh, that, even in the time of the first dynasties in the Nile Valley, a high civilization had already been developed. Take, first, man himself: we find sculptured upon the early monuments types of the various races Egyptians, Israelites, negroes, and Libyans as clearly distinguishable in these paintings and sculptures of from four to six thousand years ago as the same types are at the present day. No one can look at these sculptures upon the Egyptian monuments, or even the drawings of them, as given by Lepsius or Prisse d' Avennes, without being convinced that they indicate, even at that remote period, a difference of races so marked that long previous ages must have been required to produce it.

The social condition of Egypt revealed in these early monuments of art forces us to the same conclusion. Those earliest monuments show that a very complex society had even then been developed. We not only have a separation between the priestly and military orders, but agriculturists, manufacturers, and traders, with a whole series of subdivisions in each of these classes. The early tombs show us sculptured and painted representations of a daily life which even then had been developed into a vast wealth and variety of grades, forms, and usages.

Take, next, the political and military condition. One fact out of many reveals a policy which must have been the result of long experience. Just as now, at the end of the nineteenth century, the British Government, having found that they can not rely upon the native Egyptians for the protection of the country, are drilling the negroes from the interior of Africa as soldiers, so the celebrated inscription of Prince Una, as far back as the sixth dynasty, speaks of the Maksi or negroes levied and drilled by tens of

thousands for the Egyptian army.

Take, next, engineering. Here we find very early operations in the way of canals, dikes, and great public edifices, so bold in conception and thorough in execution as to fill our greatest engineers of these days with astonishment. The quarrying, conveyance, cutting, jointing, and polishing of the enormous blocks in the interior of the Great Pyramid alone are the marvel of the foremost stone workers of our century.

As regards architecture, we find not only the pyramids, which date from the very earliest period of Egyptian history, and which are to this hour the wonder of the world for size, for boldness, for exactness, and for skilful contrivance, but also the temples, with long ranges of colossal columns wrought in polished granite, with wonderful beauty of ornamentation, with architraves and roofs vast in size and exquisite in adjustment, which by their proportions tax the imagination, and lead the beholder to ask whether all this can be real.

As to sculpture, we have not only the great Sphinx of Gizeh, so marvellous in its boldness and dignity, dating from the very first period of Egyptian history, but we have ranges of sphinxes, heroic statues, and bas reliefs, showing that even in the early ages this branch of art had reached an amazing development.

As regards the perfection of these, Lubke, the most eminent German authority on plastic art, referring to the early works in the tombs about Memphis, declares that, "as monuments of the period of the fourth dynasty, they are an evidence of the high perfection to which the sculpture of the Egyptians had attained." Brugsch declares that "every artistic production of those early days, whether picture, writing, or sculpture, bears the stamp of the highest perfection in art." Maspero, the most eminent French authority in this field, while expressing his belief that the Sphinx was sculptured even before the time of Mena, declares that "the art which conceived and carved this prodigious statue was a finished art an art which had

attained self mastery and was sure of its effects"; while, among the more eminent English authorities, Sayce tells us that "art is at its best in the age of the pyramid builders," and Sir James Fergusson declares, "We are startled to find Egyptian art nearly as perfect in the oldest periods as in any of the later."

The evidence as to the high development of Egyptian sculpture in the earlier dynasties becomes every day more overwhelming. What exquisite genius the early Egyptian sculptors showed in their lesser statues is known to all who have seen those most precious specimens in the museum at Cairo, which were wrought before the conventional type was adopted in obedience to religious considerations.

In decorative and especially in ceramic art, as early as the fourth and fifth dynasties, we have vases, cups, and other vessels showing exquisite beauty of outline and a general sense of form almost if not quite equal to Etruscan and Grecian work of the best periods.

Take, next, astronomy. Going back to the very earliest

period of Egyptian civilization, we find that the four sides of the Great Pyramid are adjusted to the cardinal points with the utmost precision. "The day of the equinox can be taken by observing the sun set across the face of the pyramid, and the neighbouring Arabs adjust their astronomical dates by its shadow." Yet this is but one out of many facts which prove that the Egyptians, at the earliest period of which their monuments exist, had arrived at knowledge and skill only acquired by long ages of observation and thought. Mr. Lockyer, Astronomer Royal of Great Britain, has recently convinced himself, after careful examination of various ruined temples at Thebes and elsewhere, that they were placed with reference to observations of stars. To state his conclusion in his own words: "There seems a very high probability that three thousand, and possibly four thousand, years before Christ the Egyptians had among them men with some knowledge of astronomy, and that six thousand years ago the course of the sun through the year was practically very

well known, and methods had been invented by means of which in time it might be better known; and that, not very long after that, they not only considered questions relating to the sun, but began to take up other questions relating to the position and movement of the stars."

The same view of the antiquity of man in the Nile valley is confirmed by philologists. To use the words of Max Duncker: "The oldest monuments of Egypt and they are the oldest monuments in the world exhibit the Egyptian in possession of the art of writing." It is found also, by the inscriptions of the early dynasties, that the Egyptian language had even at that early time been developed in all essential particulars to the highest point it ever attained. What long periods it must have required for such a development every scholar in philology can imagine.

As regards medical science, we have the Berlin papyrus, which, although of a later period, refers with careful specification to a medical literature of the first dynasty.

As regards archaeology, the earliest known inscriptions point to still earlier events and buildings, indicating a long sequence in previous history.

As to all that pertains to the history of civilization, no man of fair and open mind can go into the museums of Cairo or the Louvre or the British Museum and look at the monuments of those earlier dynasties without seeing in them the results of a development in art, science, laws, customs, and language, which must have required a vast period before the time of Mena. And this conclusion is forced upon us all the more invincibly when we consider the slow growth of ideas in the earlier stages of civilization as compared with the later a slowness of growth which has kept the natives of many parts of the world in that earliest civilization to this hour. To this we must add the fact that Egyptian civilization was especially immobile: its development into castes is but one among many evidences that it was the very opposite of a civilization developed rapidly.

As to the length of the period before the time of Mena, there is, of course, nothing exact. Manetho gives lists of great personages before that first dynasty, and these extend over twenty four thousand years. Bunsen, one of the most learned of Christian scholars, declares that not less than ten thousand years were necessary for the development of civilization up to the point where we find it in Mena's time. No one can claim precision for either of these statements, but they are valuable as showing the impression of vast antiquity made upon the most competent judges by the careful study of those remains: no unbiased judge can doubt that an immensely long period of years must have been required for the development of civilization up to the state in which we there find it.

The investigations in the bed of the Nile confirm these views. That some unwarranted conclusions have at times been announced is true; but the fact remains that again and again rude pottery and other evidences of early stages of civilization have been found in borings at places so distant

from each other, and at depths so great, that for such a range of concurring facts, considered in connection with the rate of earthy deposit by the Nile, there is no adequate explanation save the existence of man in that valley thousands on thousands of years before the longest time admitted by our sacred chronologists.

Nor have these investigations been of a careless character. Between the years 1851 and 1854, Mr. Horner, an extremely cautious English geologist, sank ninety six shafts in four rows at intervals of eight English miles, at right angles to the Nile, in the neighbourhood of Memphis. In these pottery was brought up from various depths, and beneath the statue of Rameses II at Memphis from a depth of thirty nine feet. At the rate of the Nile deposit a careful estimate has declared this to indicate a period of over eleven thousand years. So eminent a German authority, in geography as Peschel characterizes objections to such deductions as groundless. However this may be, the general results of these investigations, taken in connection

with the other results of research, are convincing.

And, finally, as if to make assurance doubly sure, a series of archaeologists of the highest standing, French, German, English, and American, have within the past twenty years discovered relics of a savage period, of vastly earlier date than the time of Mena, prevailing throughout Egypt. These relics have been discovered in various parts of the country, from Cairo to Luxor, in great numbers. They are the same sort of prehistoric implements which prove to us the early existence of man in so many other parts of the world at a geological period so remote that the figures given by our sacred chronologists are but trivial. The last and most convincing of these discoveries, that of flint implements in the drift, far down below the tombs of early kings at Thebes, and upon high terraces far above the present bed of the Nile, will be referred to later.

But it is not in Egypt alone that proofs are found of the utter inadequacy of the entire chronological system derived from our sacred books. These results of research in Egypt

are strikingly confirmed by research in Assyria and Babylonia. Prof. Sayce exhibits various proofs of this. To use his own words regarding one of these proofs: "On the shelves of the British Museum you may see huge sun dried bricks, on which are stamped the names and titles of kings who erected or repaired the temples where they have been found They must have reigned before the time when, according to the margins of our Bibles, the Flood of Noah was covering the earth and reducing such bricks as these to their primeval slime."

This conclusion was soon placed beyond a doubt. The lists of king's and collateral inscriptions recovered from the temples of the great valley between the Tigris and Euphrates, and the records of astronomical observations in that region, showed that there, too, a powerful civilization had grown up at a period far earlier than could be made consistent with our sacred chronology. The science of Assyriology was thus combined with Egyptology to furnish one more convincing proof that, precious as are the

moral and religious truths in our sacred books and the historical indications which they give us, these truths and indications are necessarily inclosed in a setting of myth and legend.

CHAPTER VII. THE ANTIQUITY OF MAN AND PREHISTORIC ARCHAEOLOGY

I. THE THUNDER STONES.

While the view of chronology based upon the literal acceptance of Scripture texts was thus shaken by researches in Egypt, another line of observation and thought was slowly developed, even more fatal to the theological view.

From a very early period there had been dug from the earth, in various parts of the world, strangely shaped masses of stone, some rudely chipped, some polished: in ancient times the larger of these were very often considered as thunderbolts, the smaller as arrows, and all of them as weapons which had been hurled by the gods and other

supernatural personages. Hence a sort of sacredness attached to them. In Chaldea, they were built into the wall of temples; in Egypt, they were strung about the necks of the dead. In India, fine specimens are to this day seen upon altars, receiving prayers and sacrifices.

Naturally these beliefs were brought into the Christian mythology and adapted to it. During the Middle Ages many of these well wrought stones were venerated as weapons, which during the "war in heaven" had been used in driving forth Satan and his hosts; hence in the eleventh century an Emperor of the East sent to the Emperor of the West a "heaven axe"; and in the twelfth century a Bishop of Rennes asserted the value of thunder stones as a divinely appointed means of securing success in battle, safety on the sea, security against thunder, and immunity from unpleasant dreams. Even as late as the seventeenth century a French ambassador brought a stone hatchet, which still exists in the museum at Nancy, as a present to the Prince Bishop of Verdun, and claimed for it health

giving virtues.

In the last years of the sixteenth century Michael Mercati tried to prove that the "thunder stones" were weapons or implements of early races of men; but from some cause his book was not published until the following century, when other thinkers had begun to take up the same idea, and then it had to contend with a theory far more accordant with theologic modes of reasoning in science. This was the theory of the learned Tollius, who in 1649 told the world that these chipped or smoothed stones were "generated in the sky by a fulgurous exhalation conglobed in a cloud by the circumposed humour."

But about the beginning of the eighteenth century a fact of great importance was quietly established. In the year 1715 a large pointed weapon of black flint was found in contact with the bones of an elephant, in a gravel bed near Gray’s Inn Lane, in London. The world in general paid no heed to this: if the attention of theologians was called to it, they dismissed it summarily with a reference to the Deluge

of Noah; but the specimen was labelled, the circumstances regarding it were recorded, and both specimen and record carefully preserved.

In 1723 Jussieu addressed the French Academy on The Origin and Uses of Thunder stones. He showed that recent travellers from various parts of the world had brought a number of weapons and other implements of stone to France, and that they were essentially similar to what in Europe had been known as "thunder stones." A year later this fact was clinched into the scientific mind of France by the Jesuit Lafitau, who published a work showing the similarity between the customs of aborigines then existing in other lands and those of the early inhabitants of Europe. So began, in these works of Jussieu and Lafitau, the science of Comparative Ethnography.

But it was at their own risk and peril that thinkers drew from these discoveries any conclusions as to the antiquity of man. Montesquieu, having ventured to hint, in an early edition of his Persian Letters, that the world might

be much older than had been generally supposed, was soon made to feel danger both to his book and to himself, so that in succeeding editions he suppressed the passage.

In 1730 Mahudel presented a paper to the French Academy of Inscriptions on the so called "thunder stones," and also presented a series of plates which showed that these were stone implements, which must have been used at an early period in human history.

In 1778 Buffon, in his Epoques de la Nature, intimated his belief that "thunder stones" were made by early races of men; but he did not press this view, and the reason for his reserve was obvious enough: he had already one quarrel with the theologians on his hands, which had cost him dear public retraction and humiliation. His declaration, therefore, attracted little notice.

In the year 1800 another fact came into the minds of thinking men in England. In that year John Frere presented to the London Society of Antiquaries sundry flint implements found in the clay beds near Hoxne: that they

were of human make was certain, and, in view of the undisturbed depths in which they were found, the theory was suggested that the men who made them must have lived at a very ancient geological epoch; yet even this discovery and theory passed like a troublesome dream, and soon seemed to be forgotten.

About twenty years later Dr. Buckland published a discussion of the subject, in the light of various discoveries in the drift and in caves. It received wide attention, but theology was soothed by his temporary concession that these striking relics of human handiwork, associated with the remains of various extinct animals, were proofs of the Deluge of Noah.

In 1823 Boue, of the Vienna Academy of Sciences, showed to Cuvier sundry human bones found deep in the alluvial deposits of the upper Rhine, and suggested that they were of an early geological period; this Cuvier virtually, if not explicitly, denied. Great as he was in his own field, he was not a great geologist; he, in fact, led

geology astray for many years. Moreover, he lived in a time of reaction; it was the period of the restored Bourbons, of the Voltairean King Louis XVIII, governing to please orthodoxy. Boue's discovery was, therefore, at first opposed, then enveloped in studied silence.

Cuvier evidently thought, as Voltaire had felt under similar circumstances, that "among wolves one must howl a little"; and his leading disciple, Elie de Beaumont, who succeeded, him in the sway over geological science in France, was even more opposed to the new view than his great master had been. Boue's discoveries were, therefore, apparently laid to rest forever.

In 1825 Kent's Cavern, near Torquay, was explored by the Rev. Mr. McEnery, a Roman Catholic clergyman, who seems to have been completely overawed by orthodox opinion in England and elsewhere; for, though he found human bones and implements mingled with remains of extinct animals, he kept his notes in manuscript, and they were only brought to light more than thirty years later

by Mr. Vivian.

The coming of Charles X, the last of the French Bourbons, to the throne, made the orthodox pressure even greater. It was the culmination of the reactionary period the time in France when a clerical committee, sitting at the Tuileries, took such measures as were necessary to hold in check all science that was not perfectly "safe"; the time in Austria when Kaiser Franz made his famous declaration to sundry professors, that what he wanted of them was simply to train obedient subjects, and that those who did not make this their purpose would be dismissed; the time in Germany when Nicholas of Russia and the princelings and ministers under his control, from the King of Prussia downward, put forth all their might in behalf of "scriptural science"; the time in Italy when a scientific investigator, arriving at any conclusion distrusted by the Church, was sure of losing his place and in danger of losing his liberty; the time in England when what little science was taught was held in due submission to Archdeacon Paley; the time

in the United States when the first thing essential in science was, that it be adjusted to the ideas of revival exhorters.

Yet men devoted to scientific truth laboured on; and in 1828 Tournal, of Narbonne, discovered in the cavern of Bize specimens of human industry, with a fragment of a human skeleton, among bones of extinct animals. In the following year Christol published accounts of his excavations in the caverns of Gard; he had found in position, and under conditions which forbade the idea of after disturbance, human remains mixed with bones of the extinct hyena of the early Quaternary period. Little general notice was taken of this, for the reactionary orthodox atmosphere involved such discoveries in darkness.

But in the French Revolution of 1830 the old politico theological system collapsed: Charles X and his advisers fled for their lives; the other continental monarchs got glimpses of new light; the priesthood in charge of education were put on their good behaviour for a time, and

a better era began.

Under the constitutional monarchy of the house of Orleans in France and Belgium less attention was therefore paid by Government to the saving of souls; and we have in rapid succession new discoveries of remains of human industry, and even of human skeletons so mingled with bones of extinct animals as to give additional proofs that the origin of man was at a period vastly earlier than any which theologians had dreamed of.

A few years later the reactionary clerical influence against science in this field rallied again. Schmerling in 1833 had explored a multitude of caverns in Belgium, especially at Engis and Engihoul, and had found human skulls and bones closely associated with bones of extinct animals, such as the cave bear, hyena, elephant, and rhinoceros, while mingled with these were evidences of human workmanship in the shape of chipped flint implements; discoveries of a similar sort had been made by De Serres in France and by Lund in Brazil; but, at

least as far as continental Europe was concerned, these discoveries were received with much coolness both by Catholic leaders of opinion in France and Belgium and by Protestant leaders in England and Holland. Schmerling himself appears to have been overawed, and gave forth a sort of apologetic theory, half scientific, half theologic, vainly hoping to satisfy the clerical side.

Nor was it much better in England. Sir Charles Lyell, so devoted a servant of prehistoric research thirty years later, was still holding out against it on the scientific side; and, as to the theological side, it was the period when that great churchman, Dean Cockburn, was insulting geologists from the pulpit of York Minster, and the Rev. Mellor Brown denouncing geology as "a black art," "a forbidden province" and when, in America, Prof. Moses Stuart and others like him were belittling the work of Benjamin Silliman and Edward Hitchcock.

In 1840 Godwin Austin presented to the Royal Geological Society an account of his discoveries in Kent’s

Cavern, near Torquay, and especially of human bones and implements mingled with bones of the elephant, rhinoceros, cave bear, hyena, and other extinct animals; yet this memoir, like that of McEnery fifteen years before, found an atmosphere so unfavourable that it was not published.

II. THE FLINT WEAPONS AND IMPLEMENTS.

At the middle of the nineteenth century came the beginning of a new epoch in science an epoch when all these earlier discoveries were to be interpreted by means of investigations in a different field: for, in 1847, a man previously unknown to the world at large, Boucher de Perthes, published at Paris the first volume of his work on Celtic and Antediluvian Antiquities, and in this he showed engravings of typical flint implements and weapons, of which he had discovered thousands upon thousands in the high drift beds near Abbeville, in northern France.

The significance of this discovery was great indeed far greater than Boucher himself at first supposed. The very

title of his book showed that he at first regarded these implements and weapons as having belonged to men overwhelmed at the Deluge of Noah; but it was soon seen that they were something very different from proofs of the literal exactness of Genesis: for they were found in terraces at great heights above the river Somme, and, under any possible theory having regard to fact, must have been deposited there at a time when the river system of northern France was vastly different from anything known within the historic period. The whole discovery indicated a series of great geological changes since the time when these implements were made, requiring cycles of time compared to which the space allowed by the orthodox chronologists was as nothing.

His work was the result of over ten years of research and thought. Year after year a force of men under his direction had dug into these high terraced gravel deposits of the river Somme, and in his book he now gave, in the first full form, the results of his labour. So far as France was

concerned, he was met at first by what he calls "a conspiracy of silence," and then by a contemptuous opposition among orthodox scientists, at the head of whom stood Elie de Beaumont.

This heavy, sluggish opposition seemed immovable: nothing that Boucher could do or say appeared to lighten the pressure of the orthodox theological opinion behind it; not even his belief that these fossils were remains of men drowned at the Deluge of Noah, and that they were proofs of the literal exactness of Genesis seemed to help the matter. His opponents felt instinctively that such discoveries boded danger to the accepted view, and they were right: Boucher himself soon saw the folly of trying to account for them by the orthodox theory.

And it must be confessed that not a little force was added to the opposition by certain characteristics of Boucher de Perthes himself. Gifted, far sighted, and vigorous as he was, he was his own worst enemy. Carried away by his own discoveries, he jumped to the most

astounding conclusions. The engravings in the later volume of his great work, showing what he thought to be human features and inscriptions upon some of the flint implements, are worthy of a comic almanac; and at the National Museum of Archaeology at St. Germain, beneath the shelves bearing the remains which he discovered, which mark the beginning of a new epoch in science, are drawers containing specimens hardly worthy of a penny museum, but from which he drew the most unwarranted inferences as to the language, religion, and usages of prehistoric man.

Boucher triumphed none the less. Among his bitter opponents at first was Dr. Rigollot, who in 1855, searching earnestly for materials to refute the innovator, dug into the deposits of St. Acheul and was converted: for he found implements similar to those of Abbeville, making still more certain the existence of man during the Drift period. So, too, Gaudry a year later made similar discoveries.

But most important was the evidence of the truth which now came from other parts of France and from other

countries. The French leaders in geological science had been held back not only by awe of Cuvier but by recollections of Scheuchzer. Ridicule has always been a serious weapon in France, and the ridicule which finally overtook the supporters of the attempt of Scheuchzer, Mazurier, and others, to square geology with Genesis, was still remembered. From the great body of French geologists, therefore, Boucher secured at first no aid. His support came from the other side of the Channel. The most eminent English geologists, such as Falconer, Prestwich, and Lyell, visited the beds at Abbeville and St. Acheul, convinced themselves that the discoveries of Boucher, Rigollot, and their colleagues were real, and then quietly but firmly told England the truth.

And now there appeared a most effective ally in France. The arguments used against Boucher de Perthes and some of the other early investigators of bone caves had been that the implements found might have been washed about and turned over by great floods, and therefore that

they might be of a recent period; but in 1861 Edward Lartet published an account of his own excavations at the Grotto of Aurignac, and the proof that man had existed in the time of the Quaternary animals was complete. This grotto had been carefully sealed in prehistoric times by a stone at its entrance; no interference from disturbing currents of water had been possible; and Lartet found, in place, bones of eight out of nine of the main species of animals which characterize the Quaternary period in Europe; and upon them marks of cutting implements, and in the midst of them coals and ashes.

Close upon these came the excavations at Eyzies by Lartet and his English colleague, Christy. In both these men there was a carefulness in making researches and a sobriety in stating results which converted many of those who had been repelled by the enthusiasm of Boucher de Perthes. The two colleagues found in the stony deposits made by the water dropping from the roof of the cave at Eyzies the bones of numerous animals extinct or departed to arctic

regions one of these a vertebra of a reindeer with a flint lance head still fast in it, and with these were found evidences of fire.

Discoveries like these were thoroughly convincing; yet there still remained here and there gainsayers in the supposed interest of Scripture, and these, in spite of the convincing array of facts, insisted that in some way, by some combination of circumstances, these bones of extinct animals of vastly remote periods might have been brought into connection with all these human bones and implements of human make in all these different places, refusing to admit that these ancient relics of men and animals were of the same period. Such gainsayers virtually adopted the reasoning of quaint old Persons, who, having maintained that God created the world "about five thousand sixe hundred and odde yeares agoe," added, "And if they aske what God was doing before this short number of yeares, we answere with St. Augustine replying to such curious questioners, that He was framing Hell for them."

But a new class of discoveries came to silence this opposition. At La Madeleine in France, at the Kessler cave in Switzerland, and at various other places, were found rude but striking carvings and engravings on bone and stone representing sundry specimens of those long vanished species; and these specimens, or casts of them, were soon to be seen in all the principal museums. They showed the hairy mammoth, the cave bear, and various other animals of the Quaternary period, carved rudely but vigorously by contemporary men; and, to complete the significance of these discoveries, travellers returning from the icy regions of North America brought similar carvings of animals now existing in those regions, made by the Eskimos during their long arctic winters to day.

As a result of these discoveries and others like them, showing that man was not only contemporary with long extinct animals of past geological epochs, but that he had already developed into a stage of culture above pure savagery, the tide of thought began to turn. Especially was

this seen in 1863, when Lyell published the first edition of his Geological Evidence of the Antiquity of Man; and the fact that he had so long opposed the new ideas gave force to the clear and conclusive argument which led him to renounce his early scientific beliefs.

Research among the evidences of man's existence in the early Quaternary, and possibly in the Tertiary period, was now pressed forward along the whole line. In 1864 Gabriel Mortillet founded his review devoted to this subject; and in 1865 the first of a series of scientific congresses devoted to such researches was held in Italy. These investigations went on vigorously in all parts of France and spread rapidly to other countries. The explorations which Dupont began in 1864, in the caves of Belgium, gave to the museum at Brussels eighty thousand flint implements, forty thousand bones of animals of the Quaternary period, and a number of human skulls and bones found mingled with these remains. From Germany, Italy, Spain, America, India, and Egypt similar results were reported.

Especially noteworthy were the further explorations of the caves and drift throughout the British Islands. The discovery by Colonel Wood, In 1861, of flint tools in the same strata with bones of the earlier forms of the rhinoceros, was but typical of many. A thorough examination of the caverns of Brixham and Torquay, by Pengelly and others, made it still more evident that man had existed in the early Quaternary period. The existence of a period before the Glacial epoch or between different glacial epochs in England, when the Englishman was a savage, using rude stone tools, was then fully ascertained, and, what was more significant, there were clearly shown a gradation and evolution even in the history of that period. It was found that this ancient Stone epoch showed progress and development. In the upper layers of the caves, with remains of the reindeer, who, although he has migrated from these regions, still exists in more northern climates, were found stone implements revealing some little advance in civilization; next below these, sealed up in the stalagmite,

came, as a rule, another layer, in which the remains of reindeer were rare and those of the mammoth more frequent, the implements found in this stratum being less skilfully made than those in the upper and more recent layers; and, finally, in the lowest levels, near the floors of these ancient caverns, with remains of the cave bear and others of the most ancient extinct animals, were found stone implements evidently of a yet ruder and earlier stage of human progress. No fairly unprejudiced man can visit the cave and museum at Torquay without being convinced that there were a gradation and an evolution in these beginnings of human civilization. The evidence is complete; the masses of breccia taken from the cave, with the various soils, implements, and bones carefully kept in place, put this progress beyond a doubt.

All this indicated a great antiquity for the human race, but in it lay the germs of still another great truth, even more important and more serious in its consequences to the older theologic view, which will be discussed in the

following chapter.

But new evidences came in, showing a yet greater antiquity of man. Remains of animals were found in connection with human remains, which showed not only that man was living in times more remote than the earlier of the new investigators had dared dream, but that some of these early periods of his existence must have been of immense length, embracing climatic changes betokening different geological periods; for with remains of fire and human implements and human bones were found not only bones of the hairy mammoth and cave bear, woolly rhinoceros, and reindeer, which could only have been deposited there in a time of arctic cold, but bones of the hyena, hippopotamus, sabre toothed tiger, and the like, which could only have been deposited when there was in these regions a torrid climate. The conjunction of these remains clearly showed that man had lived in England early enough and long enough to pass through times when there was arctic cold and times when there was torrid heat; times

when great glaciers stretched far down into England and indeed into the continent, and times when England had a land connection with the European continent, and the European continent with Africa, allowing tropical animals to migrate freely from Africa to the middle regions of England. The question of the origin of man at a period vastly earlier than the sacred chronologists permitted was thus absolutely settled, but among the questions regarding the existence of man at a period yet more remote, the Drift period, there was one which for a time seemed to give the champions of science some difficulty. The orthodox leaders in the time of Boucher de Perthes, and for a considerable time afterward, had a weapon of which they made vigorous use: the statement that no human bones had yet been discovered in the drift. The supporters of science naturally answered that few if any other bones as small as those of man had been found, and that this fact was an additional proof of the great length of the period since man had lived with the extinct animals; for, since specimens of

human workmanship proved man's existence as fully as remains of his bones could do, the absence or even rarity of human and other small bones simply indicated the long periods of time required for dissolving them away.

Yet Boucher, inspired by the genius he had already shown, and filled with the spirit of prophecy, declared that human bones would yet be found in the midst of the flint implements, and in 1863 he claimed that this prophecy had been fulfilled by the discovery at Moulin Quignon of a portion of a human jaw deep in the early Quaternary deposits. But his triumph was short lived: the opposition ridiculed his discovery; they showed that he had offered a premium to his workmen for the discovery of human remains, and they naturally drew the inference that some tricky labourer had deceived him. The result of this was that the men of science felt obliged to acknowledge that the Moulin Quignon discovery was not proven.

But ere long human bones were found in the deposits of the early Quaternary period, or indeed of an earlier

period, in various other parts of the world, and the question regarding the Moulin Quignon relic was of little importance.

We have seen that researches regarding the existence of prehistoric man in England and on the Continent were at first mainly made in the caverns; but the existence of man in the earliest Quaternary period was confirmed on both sides of the English Channel, in a way even more striking, by the close examination of the drift and early gravel deposits. The results arrived at by Boucher de Perthes were amply confirmed in England. Rude stone implements were found in terraces a hundred feet and more above the levels at which various rivers of Great Britain now flow, and under circumstances which show that, at the time when they were deposited, the rivers of Great Britain in many cases were entirely different from those of the present period, and formed parts of the river system of the European continent. Researches in the high terraces above the Thames and the Ouse, as well as at other points in Great

Britain, placed beyond a doubt the fact that man existed on the British Islands at a time when they were connected by solid land with the Continent, and made it clear that, within the period of the existence of man in northern Europe, a large portion of the British Islands had been sunk to depths between fifteen hundred and twenty five hundred feet beneath the Northern Ocean, had risen again from the water, had formed part of the continent of Europe, and had been in unbroken connection with Africa, so that elephants, bears, tigers, lions, the rhinoceros and hippopotamus, of species now mainly extinct, had left their bones in the same deposits with human implements as far north as Yorkshire. Moreover, connected with this fact came in the new conviction, forced upon geologists by the more careful examination of the earth and its changes, that such elevations and depressions of Great Britain and other parts of the world were not necessarily the results of sudden cataclysms, but generally of slow processes extending through vast cycles of years processes such as are now

known to be going on in various parts of the world. Thus it was that the six or seven thousand years allowed by the most liberal theologians of former times were seen more and more clearly to be but a mere nothing in the long succession of ages since the appearance of man.

Confirmation of these results was received from various other parts of the world. In Africa came the discovery of flint implements deep in the hard gravel of the Nile Valley at Luxor and on the high hills behind Esneh. In America the discoveries at Trenton, N.J., and at various places in Delaware, Ohio, Minnesota, and elsewhere, along the southern edge of the drift of the Glacial epochs, clinched the new scientific truth yet more firmly; and the statement made by an eminent American authority is, that "man was on this continent when the climate and ice of Greenland extended to the mouth of New York harbour." The discoveries of prehistoric remains on the Pacific coast, and especially in British Columbia, finished completely the last chance at a reasonable contention by the adherents of

the older view. As to these investigations on the Pacific slope of the United States, the discoveries of Whitney and others in California had been so made and announced that the judgment of scientific men regarding them was suspended until the visit of perhaps the greatest living authority in his department, Alfred Russel Wallace, in 1887. He confirmed the view of Prof. Whitney and others with the statement that "both the actual remains and works of man found deep under the lava flows of Pliocene age show that he existed in the New World at least as early as in the Old." To this may be added the discoveries in British Columbia, which prove that, since man existed in these regions, "valleys have been filled up by drift from the waste of mountains to a depth in some cases of fifteen hundred feet; this covered by a succession of tuffs, ashes, and lava streams from volcanoes long since extinct, and finally cut down by the present rivers through beds of solid basalt, and through this accumulation of lavas and gravels." The immense antiquity of the human remains in the gravels of

the Pacific coast is summed up by a most eminent English authority and declared to be proved, "first, by the present river systems being of subsequent date, sometimes cutting through them and their superincumbent lava cap to a depth of two thousand feet; secondly, by the great denudation that has taken place since they were deposited, for they sometimes lie on the summits of mountains six thousand feet high; thirdly, by the fact that the Sierra Nevada has been partly elevated since their formation."

As an important supplement to these discoveries of ancient implements came sundry comparisons made by eminent physiologists between human skulls and bones found in different places and under circumstances showing vast antiquity.

Human bones had been found under such circumstances as early as 1835 at Cannstadt near Stuttgart, and in 1856 in the Neanderthal near Dusseldorf; but in more recent searches they had been discovered in a multitude of places, especially in Germany, France,

Belgium, England, the Caucasus, Africa, and North and South America. Comparison of these bones showed that even in that remote Quaternary period there were great differences of race, and here again came in an argument for the yet earlier existence of man on the earth; for long previous periods must have been required to develop such racial differences. Considerations of this kind gave a new impulse to the belief that man's existence might even date back into the Tertiary period. The evidence for this earlier origin of man was ably summed up, not only by its brilliant advocate, Mortillet, but by a former opponent, one of the most conservative of modern anthropologists, Quatrefages; and the conclusion arrived at by both was, that man did really exist in the Tertiary period. The acceptance of this conclusion was also seen in the more recent work of Alfred Russel Wallace, who, though very cautious and conservative, placed the origin of man not only in the Tertiary period, but in an earlier stage of it than most had dared assign even in the Miocene.

The first thing raising a strong presumption, if not giving proof, that man existed in the Tertiary, was the fact that from all explored parts of the world came in more and more evidence that in the earlier Quaternary man existed in different, strongly marked races and in great numbers. From all regions which geologists had explored, even from those the most distant and different from each other, came this same evidence from northern Europe to southern Africa; from France to China; from New Jersey to British Columbia; from British Columbia to Peru. The development of man in such numbers and in so many different regions, with such differences of race and at so early a period, must have required a long previous time.

This argument was strengthened by discoveries of bones bearing marks apparently made by cutting instruments, in the Tertiary formations of France and Italy, and by the discoveries of what were claimed to be flint implements by the Abbe Bourgeois in France, and of implements and human bones by Prof. Capellini in Italy.

On the other hand, some of the more cautious men of science are still content to say that the existence of man in the Tertiary period is not yet proven. As to his existence throughout the Quaternary epoch, no new proofs are needed; even so determined a supporter of the theological side as the Duke of Argyll has been forced to yield to the evidence.

Of attempts to make an exact chronological statement throwing light on the length of the various prehistoric periods, the most notable have been those by M. Morlot, on the accumulated strata of the Lake of Geneva; by Gillieron, on the silt of Lake Neufchatel; by Horner, in the delta deposits of Egypt; and by Riddle, in the delta of the Mississippi. But while these have failed to give anything like an exact result, all these investigations together point to the central truth, so amply established, of the vast antiquity of man, and the utter inadequacy of the chronology given in our sacred books. The period of man's past life upon our planet, which has been fixed by the universal Church,

"always, everywhere, and by all," is thus perfectly proved to be insignificant compared with those vast geological epochs during which man is now known to have existed.

CHAPTER VIII. THE "FALL OF MAN" AND ANTHROPOLOGY

In the previous chapters we have seen how science, especially within the eighteenth and nineteenth centuries, has thoroughly changed the intelligent thought of the world in regard to the antiquity of man upon our planet; and how the fabric built upon the chronological indications in our sacred books first, by the early fathers of the Church, afterward by the medieval doctors, and finally by the reformers and modern orthodox chronologists has virtually disappeared before an entirely different view forced upon us, especially by Egyptian and Assyrian studies, as well as by geology and archeology.

In this chapter I purpose to present some outlines of

the work of Anthropology, especially as assisted by Ethnology, in showing what the evolution of human civilization has been.

Here, too, the change from the old theological view based upon the letter of our sacred books to the modern scientific view based upon evidence absolutely irrefragable is complete. Here, too, we are at the beginning of a vast change in the basis and modes of thought upon man a change even more striking than that accomplished by Copernicus and Galileo, when they substituted for a universe in which sun and planets revolved about the earth a universe in which the earth is but the merest grain or atom revolving with other worlds, larger and smaller, about the sun; and all these forming but one among innumerable systems.

Ever since the beginning of man's effective thinking upon the great problems around him, two antagonistic views have existed regarding the life of the human race upon earth. The first of these is the belief that man was

created "in the beginning" a perfect being, endowed with the highest moral and intellectual powers, but that there came a "fall," and, as its result, the entrance into the world of evil, toil, sorrow, and death.

Nothing could be more natural than such an explanation of the existence of evil, in times when men saw everywhere miracle and nowhere law. It is, under such circumstances, by far the most easy of explanations, for it is in accordance with the appearances of things: men adopted it just as naturally as they adopted the theory that the Almighty hangs up the stars as lights in the solid firmament above the earth, or hides the sun behind a mountain at night, or wheels the planets around the earth, or flings comets as "signs and wonders" to scare a wicked world, or allows evil spirits to control thunder, lightning, and storm, and to cause diseases of body and mind, or opens the "windows of heaven" to let down "the waters that be above the heavens," and thus to give rain upon the earth.

A belief, then, in a primeval period of innocence

and perfection moral, intellectual, and physical from which men for some fault fell, is perfectly in accordance with what we should expect.

Among the earliest known records of our race we find this view taking shape in the Chaldean legends of war between the gods, and of a fall of man; both of which seemed necessary to explain the existence of evil.

In Greek mythology perhaps the best known statement was made by Hesiod: to him it was revealed, regarding the men of the most ancient times, that they were at first "a golden race," that "as gods they were wont to live, with a life void of care, without labour and trouble; nor was wretched old age at all impending; but ever did they delight themselves out of the reach of all ills, and they died as if overcome by sleep; all blessings were theirs: of its own will the fruitful field would bear them fruit, much and ample, and they gladly used to reap the labours of their hands in quietness along with many good things, being rich in flocks and true to the blessed gods." But there came a "fall,"

caused by human curiosity. Pandora, the first woman created, received a vase which, by divine command, was to remain closed; but she was tempted to open it, and troubles, sorrow, and disease escaped into the world, hope alone remaining.

So, too, in Roman mythological poetry the well known picture by Ovid is but one among the many exhibitions of this same belief in a primeval golden age a Saturnian cycle; one of the constantly recurring attempts, so universal and so natural in the early history of man, to account for the existence of evil, care, and toil on earth by explanatory myths and legends.

This view, growing out of the myths, legends, and theologies of earlier peoples, we also find embodied in the sacred tradition of the Jews, and especially in one of the documents which form the impressive poem beginning the books attributed to Moses. As to the Christian Church, no word of its Blessed Founder indicates that it was committed by him to this theory, or that he even thought it worthy of

his attention. How, like so many other dogmas never dreamed of by Jesus of Nazareth and those who knew him best, it was developed, it does not lie within the province of this chapter to point out; nor is it worth our while to dwell upon its evolution in the early Church, in the Middle Ages, at the Reformation, and in various branches of the Protestant Church: suffice it that, though among English speaking nations by far the most important influence in its favour has come from Milton's inspiration rather than from that of older sacred books, no doctrine has been more universally accepted, "always, everywhere, and by all," from the earliest fathers of the Church down to the present hour.

On the other hand appeared at an early period the opposite view that mankind, instead of having fallen from a high intellectual, moral, and religious condition, has slowly risen from low and brutal beginnings. In Greece, among the philosophers contemporary with Socrates, we find Critias depicting a rise of man, from a time when he was

beastlike and lawless, through a period when laws were developed, to a time when morality received enforcement from religion; but among all the statements of this theory the most noteworthy is that given by Lucretius in his great poem on The Nature of Things. Despite its errors, it remains among the most remarkable examples of prophetic insight in the history of our race. The inspiration of Lucretius gave him almost miraculous glimpses of truth; his view of the development of civilization from the rudest beginnings to the height of its achievements is a wonderful growth, rooted in observation and thought, branching forth into a multitude of striking facts and fancies; and among these is the statement regarding the sequence of inventions:

"Man's earliest arms were fingers, teeth, and nails, And stones and fragments from the branching woods; Then copper next; and last, as latest traced, The tyrant, iron."

Thus did the poet prophesy one of the most fruitful

achievements of modern science: the discovery of that series of epochs which has been so carefully studied in our century.

Very striking, also, is the statement of Horace, though his idea is evidently derived from Lucretius. He dwells upon man's first condition on earth as low and bestial, and pictures him lurking in caves, progressing from the use of his fists and nails, first to clubs, then to arms which he had learned to forge, and, finally, to the invention of the names of things, to literature, and to laws.

"Arma antiqua, manus, ungues, dentesque fuerunt, Et lapides, et item sylvarum fragmina rami, Posterius ferri vis est, aerisque reperta, Sed prior aeris erat, quam ferri cognitus usus"

the translation is that of Good. For a more exact prose translation, see Munro's Lucretius, fourth edition, which is much more careful, at least in the proof reading, than the first edition. As regards Lucretius's propheitc insight into some of the greatest conclusiuons of modern

science, see Munro's translation and notes, fourth edition, book v, notes ii, p. 335. On the relation of several passages in Horace to the ideas of Lucretius, see Munro as above. For the passage from Luther, see the Table Talk, Hazlitt's translation, p. 242.

During the mediaeval ages of faith this view was almost entirely obscured, and at the Reformation it seemed likely to remain so. Typical of the simplicity of belief in "the Fall" cherished among the Reformers is Luther's declaration regarding Adam and Eve. He tells us, "they entered into the garden about noon, and having a desire to eat, she took the apple; then came the fall according to our account at about two o'clock." But in the revival of learning the old eclipsed truth reappeared, and in the first part of the seventeenth century we find that, among the crimes for which Vanini was sentenced at Toulouse to have his tongue torn out and to be burned alive, was his belief that there is a gradation extending upward from the lowest to the highest form of created beings.

Yet, in the same century, the writings of Bodin, Bacon, Descartes, and Pascal were evidently undermining the old idea of "the Fall." Bodin especially, brilliant as were his services to orthodoxy, argued lucidly against the doctrine of general human deterioration.

Early in the eighteenth century Vico presented the philosophy of history as an upward movement of man out of animalism and barbarism. This idea took firm hold upon human thought, and in the following centuries such men as Lessing and Turgot gave new force to it.

The investigations of the last forty years have shown that Lucretius and Horace were inspired prophets: what they saw by the exercise of reason illumined by poetic genius, has been now thoroughly based upon facts carefully ascertained and arranged until Thomsen and Nilsson, the northern archaeologists, have brought these prophecies to evident fulfilment, by presenting a scientific classification dividing the age of prehistoric man in various parts of the world between an old stone period, a new stone period, a

period of beaten copper, a period of bronze, and a period of iron, and arraying vast masses of facts from all parts of the world, fitting thoroughly into each other, strengthening each other, and showing beyond a doubt that, instead of a FALL, there has been a RISE of man, from the earliest indications in the Quaternary, or even, possibly, in the Tertiary period.

The first blow at the fully developed doctrine of "the Fall" came, as we have seen, from geology. According to that doctrine, as held quite generally from its beginnings among the fathers and doctors of the primitive Church down to its culmination in the minds of great Protestants like John Wesley, the statement in our sacred books that "death entered the world by sin" was taken as a historic fact, necessitating the conclusion that, before the serpent persuaded Eve to eat of the forbidden fruit, death on our planet was unknown. Naturally, when geology revealed, in the strata of a period long before the coming of man on earth, a vast multitude of carnivorous tribes fitted to destroy

their fellow creatures on land and sea, and within the fossilized skeletons of many of these the partially digested remains of animals, this doctrine was too heavy to be carried, and it was quietly dropped.

But about the middle of the nineteenth century the doctrine of the rise of man as opposed to the doctrine of his "fall" received a great accession of strength from a source most unexpected. As we saw in the last chapter, the facts proving the great antiquity of man foreshadowed a new and even more remarkable idea regarding him. We saw, it is true, that the opponents of Boucher de Perthes, while they could not deny his discovery of human implements in the drift, were successful in securing a verdict of "Not prove " as regarded his discovery of human bones; but their triumph was short lived. Many previous discoveries, little thought of up to that time, began to be studied, and others were added which resulted not merely in confirming the truth regarding the antiquity of man, but in establishing another doctrine which the opponents of science regarded

with vastly greater dislike the doctrine that man has not fallen from an original high estate in which he was created about six thousand years ago, but that, from a period vastly earlier than any warranted by the sacred chronologists, he has been, in spite of lapses and deteriorations, rising.

A brief review of this new growth of truth may be useful. As early as 1835 Prof. Jaeger had brought out from a quantity of Quaternary remains dug up long before at Cannstadt, near Stuttgart, a portion of a human skull, apparently of very low type. A battle raged about it for a time, but this finally subsided, owing to uncertainties arising from the circumstances of the discovery.

In 1856, in the Neanderthal, near Dusseldorf, among Quaternary remains gathered on the floor of a grotto, another skull was found bearing the same evidence of a low human type. As in the case of the Cannstadt skull, this again was fiercely debated, and finally the questions regarding it were allowed to remain in suspense. But new discoveries were made: at Eguisheim, at Brux, at Spy, and

elsewhere, human skulls were found of a similarly low type; and, while each of the earlier discoveries was open to debate, and either, had no other been discovered, might have been considered an abnormal specimen, the combination of all these showed conclusively that not only had a race of men existed at that remote period, but that it was of a type as low as the lowest, perhaps below the lowest, now known.

Research was now redoubled, and, as a result, human skulls and complete skeletons of various types began to be discovered in the ancient deposits of many other parts of the world, and especially in France, Belgium, Germany, the Caucasus, Africa, and North and South America.

But soon began to emerge from all these discoveries a fact of enormous importance. The skulls and bones found at Cro Magnon, Solutre, Furfooz, Grenelle, and elsewhere, were compared, and it was thus made certain that various races had already appeared and lived in various grades of civilization, even in those exceedingly remote epochs; that

even then there were various strata of humanity ranging from races of a very low to those of a very high type; and that upon any theory certainly upon the theory of the origin of mankind from a single pair two things were evident: first, that long, slow processes during vast periods of time must have been required for the differentiation of these races, and for the evolution of man up to the point where the better specimens show him, certainly in the early Quaternary and perhaps in the Tertiary period; and, secondly, that there had been from the first appearance of man, of which we have any traces, an UPWARD tendency.

This second conclusion, the upward tendency of man from low beginnings, was made more and more clear by bringing into relations with these remains of human bodies and of extinct animals the remains of human handiwork. As stated in the last chapter, the river drift and bone caves in Great Britain, France, and other parts of the world, revealed a progression, even in the various divisions of the earliest Stone period; for, beginning at the very lowest strata of

these remains, on the floors of the caverns, associated mainly with the bones of extinct animals, such as the cave bear, the hairy elephant, and the like, were the rudest implements then, in strata above these, sealed in the stalagmite of the cavern floors, lying with the bones of animals extinct but more recent, stone implements were found, still rude, but, as a rule, of an improved type; and, finally, in a still higher stratum, associated with bones of animals like the reindeer and bison, which, though not extinct, have departed to other climates, were rude stone implements, on the whole of a still better workmanship. Such was the foreshadowing, even at that early rude Stone period, of the proofs that the tendency of man has been from his earliest epoch and in all parts of the world, as a rule, upward.

But this rule was to be much further exemplified. About 1850, while the French and English geologists were working more especially among the relics of the drift and cave periods, noted archaeologists of the North

Forchammer, Steenstrup, and Worsaae were devoting themselves to the investigation of certain remains upon the Danish Peninsula. These remains were of two kinds: first, there were vast shell heaps or accumulations of shells and other refuse cast aside by rude tribes which at some unknown age in the past lived on the shores of the Baltic, principally on shellfish. That these shell heaps were very ancient was evident: the shells of oysters and the like found in them were far larger than any now found on those coasts; their size, so far from being like that of the corresponding varieties which now exist in the brackish waters of the Baltic, was in every case like that of those varieties which only thrive in the waters of the open salt sea. Here was a clear indication that at the time when man formed these shell heaps those coasts were in far more direct communication with the salt sea than at present, and that sufficient time must have elapsed since that period to have wrought enormous changes in sea and land throughout those regions.

Scattered through these heaps were found indications of a grade of civilization when man still used implements of stone, but implements and weapons which, though still rude, showed a progress from those of the drift and early cave period, some of them being of polished stone.

With these were other evidences that civilization had progressed. With implements rude enough to have survived from early periods, other implements never known in the drift and bone caves began to appear, and, though there were few if any bones of other domestic animals, the remains of dogs were found; everything showed that there had been a progress in civilization between the former Stone epoch and this.

The second series of discoveries in Scandinavia was made in the peat beds: these were generally formed in hollows or bowls varying in depth from ten to thirty feet, and a section of them, like a section of the deposits in the bone caverns, showed a gradual evolution of human culture. The lower strata in these great bowls were found to be

made up chiefly of mosses and various plants matted together with the trunks of fallen trees, sometimes of very large diameter; and the botanical examination of the lowest layer of these trees and plants in the various bowls revealed a most important fact: for this layer, the first in point of time, was always of the Scotch fir which now grows nowhere in the Danish islands, and can not be made to grow anywhere in them and of plants which are now extinct in these regions, but have retreated within the arctic circle. Coming up from the bottom of these great bowls there was found above the first layer a second, in which were matted together masses of oak trees of different varieties; these, too, were relics of a bygone epoch, since the oak has almost entirely disappeared from Denmark. Above these came a third stratum made up of fallen beech trees; and the beech is now, and has been since the beginning of recorded history, the most common tree of the Danish Peninsula.

Now came a second fact of the utmost importance as

connected with the first. Scattered, as a rule, through the lower of these deposits, that of the extinct fir trees and plants, were found implements and weapons of smooth stone; in the layer of oak trees were found implements of bronze; and among the layer of beeches were found implements and weapons of iron.

The general result of these investigations in these two sources, the shell mounds and the peat deposits, was the same: the first civilization evidenced in them was marked by the use of stone implements more or less smooth, showing a progress from the earlier rude Stone period made known by the bone caves; then came a later progress to a higher civilization, marked by the use of bronze implements; and, finally, a still higher development when iron began to be used.

The labours of the Danish archaeologists have resulted in the formation of a great museum at Copenhagen, and on the specimens they have found, coupled with those of the drift and bone caves, is based the classification between the

main periods or divisions in the evolution of the human race above referred to.

It was not merely in Scandinavian lands that these results were reached; substantially the same discoveries were made in Ireland and France, in Sardinia and Portugal, in Japan and in Brazil, in Cuba and in the United States; in fact, as a rule, in nearly every part of the world which was thoroughly examined.

But from another quarter came a yet more striking indication of this same evolution. As far back as the year 1829 there were discovered, in the Lake of Zurich, piles and other antiquities indicating a former existence of human dwellings, standing in the water at some distance from the shore; but the usual mixture of thoughtlessness and dread of new ideas seems to have prevailed, and nothing was done until about 1853, when new discoveries of the same kind were followed up vigorously, and Rutimeyer, Keller, Troyon, and others showed not only in the Lake of Zurich, but in many other lakes in Switzerland,

remains of former habitations, and, in the midst of these, great numbers of relics, exhibiting the grade of civilization which those lakedwellers had attained.

Here, too, were accumulated proofs of the upward tendency of the human race. Implements of polished stone, bone, leather, pottery of various grades, woven cloth, bones of several kinds of domestic animals, various sorts of grain, bread which had been preserved by charring, and a multitude of evidences of progress never found among the earlier, ruder relics of civilization, showed yet more strongly that man had arrived here at a still higher stage than his predecessor of the drift, cave, and shell heap periods, and had gone on from better to better.

Very striking evidences of this upward tendency were found in each class of implements. As by comparing the chipped flint implements of the lower and earlier strata in the cave period with those of the later and upper strata we saw progress, so, in each of the periods of polished stone, bronze, and iron, we see, by similar comparisons, a steady

progress from rude to perfected implements; and especially is this true in the remains of the various lake dwellings, for among these can be traced out constant increase in the variety of animals domesticated, and gradual improvements in means of subsistence and in ways of living.

Incidentally, too, a fact, at first sight of small account, but on reflection exceedingly important, was revealed. The earlier bronze implements were frequently found to imitate in various minor respects implements of stone; in other words, forms were at first given to bronze implements natural in working stone, but not natural in working bronze. This showed the DIRECTION of the development that it was upward from stone to bronze, not downward from bronze to stone; that it was progress rather than decline.

These investigations were supplemented by similar researches elsewhere. In many other parts of the world it was found that lake dwellers had existed in different grades of civilization, but all within a certain range, intermediate between the cave dwellers and the historic period. To

explain this epoch of the lake dwellers, history came in with the account given by Herodotus of the lake dwellings on Lake Prasias, which gave protection from the armies of Persia. Still more important, Comparative Ethnography showed that to day, in various parts of the world, especially in New Guinea and West Africa, races of men are living in lake dwellings built upon piles, and with a range of implements and weapons strikingly like many of those discovered in these ancient lake deposits of Switzerland.

In Great Britain, France, Germany, Italy, Ireland, Scotland, and other countries, remains of a different sort were also found, throwing light on this progress. The cromlechs, cranogs, mounds, and the like, though some of them indicate the work of weaker tribes pressed upon by stronger, show, as a rule, the same upward tendency.

At a very early period in the history of these discoveries, various attempts were made nominally in the interest of religion, but really in the interest of sundry

creeds and catechisms framed when men knew little or nothing of natural laws to break the force of such evidences of the progress and development of the human race from lower to higher. Out of all the earlier efforts two may be taken as fairly typical, for they exhibit the opposition to science as developed under two different schools of theology, each working in its own way. The first of these shows great ingenuity and learning, and is presented by Mr. Southall in his book, published in 1875, entitled The Recent Origin of the World. In this he grapples first of all with the difficulties presented by the early date of Egyptian civilization, and the keynote of his argument is the statement made by an eminent Egyptologist, at a period before modern archaeological discoveries were well understood, that "Egypt laughs the idea of a rude Stone age, a polished Stone age, a Bronze age, an Iron age, to scorn."

Mr. Southall's method was substantially that of the late excellent Mr. Gosse in geology. Mr. Gosse, as the readers of this work may remember, felt obliged, in the

supposed interest of Genesis, to urge that safety to men's souls might be found in believing that, six thousand years ago, the Almighty, for some inscrutable purpose, suddenly set Niagara pouring very near the spot where it is pouring now; laid the various strata, and sprinkled the fossils through them like plums through a pudding; scratched the glacial grooves upon the rocks, and did a vast multitude of things, subtle and cunning, little and great, in all parts of the world, required to delude geologists of modern times into the conviction that all these things were the result of a steady progress through long epochs. On a similar plan, Mr. Southall proposed, at the very beginning of his book, as a final solution of the problem, the declaration that Egypt, with its high civilization in the time of Mena, with its races, classes, institutions, arrangements, language, monuments all indicating an evolution through a vast previous history was a sudden creation which came fully made from the hands of the Creator. To use his own words, "The Egyptians had no Stone age, and were

born civilized."

There is an old story that once on a time a certain jovial King of France, making a progress through his kingdom, was received at the gates of a provincial town by the mayor's deputy, who began his speech on this wise: "May it please your Majesty, there are just thirteen reasons why His Honour the Mayor can not be present to welcome you this morning. The first of these reasons is that he is dead." On this the king graciously declared that this first reason was sufficient, and that he would not trouble the mayor's deputy for the twelve others.

So with Mr. Southall's argument: one simple result of scientific research out of many is all that it is needful to state, and this is, that in these later years we have a new and convincing evidence of the existence of prehistoric man in Egypt in his earliest, rudest beginnings; the very same evidence which we find in all other parts of the world which have been carefully examined. This evidence consists of stone implements and weapons which have been

found in Egypt in such forms, at such points, and in such positions that when studied in connection with those found in all other parts of the world, from New Jersey to California, from France to India, and from England to the Andaman Islands, they force upon us the conviction that civilization in Egypt, as in all other parts of the world, was developed by the same slow process of evolution from the rudest beginnings.

It is true that men learned in Egyptology had discouraged the idea of an earlier Stone age in Egypt, and that among these were Lepsius and Brugsch; but these men were not trained in prehistoric archaeology; their devotion to the study of the monuments of Egyptian civilization had evidently drawn them away from sympathy, and indeed from acquaintance, with the work of men like Boucher de Perthes, Lartet, Nilsson, Troyon, and Dawkins. But a new era was beginning. In 1867 Worsaae called attention to the prehistoric implements found on the borders of Egypt; two years later Arcelin discussed such stone implements

found beneath the soil of Sakkara and Gizeh, the very focus of the earliest Egyptian civilization; in the same year Hamy and Lenormant found such implements washed out from the depths higher up the Nile at Thebes, near the tombs of the kings; and in the following year they exhibited more flint implements found at various other places. Coupled with these discoveries was the fact that Horner and Linant found a copper knife at twenty four feet, and pottery at sixty feet, below the surface. In 1872 Dr. Reil, director of the baths at Helouan, near Cairo, discovered implements of chipped flint; and in 1877. Dr. Jukes Brown made similar discoveries in that region. In 1878 Oscar Fraas, summing up the question, showed that the stone implements were mainly such as are found in the prehistoric deposits of other countries, and that, Zittel having found them in the Libyan Desert, far from the oases, there was reason to suppose that these implements were used before the region became a desert and before Egypt was civilized. Two years later Dr. Mook, of

Wurzburg, published a work giving the results of his investigations, with careful drawings of the rude stone implements discovered by him in the upper Nile Valley, and it was evident that, while some of these implements differed slightly from those before known, the great mass of them were of the character so common in the prehistoric deposits of other parts of the world.

A yet more important contribution to this mass of facts was made by Prof. Henry Haynes, of Boston, who in the winter of 1877 and 1878 began a very thorough investigation of the subject, and discovered, a few miles east of Cairo, many flint implements. The significance of Haynes's discoveries was twofold: First, there were, among these, stone axes like those found in the French drift beds of St. Acheul, showing that the men who made or taught men how to make these in Egypt were passing through the same phase of savagery as that of Quaternary France; secondly, he found a workshop for making these implements, proving that these flint implements were not

brought into Egypt by invaders, but were made to meet the necessities of the country. From this first field Prof. Haynes went to Helouan, north of Cairo, and there found, as Dr. Reil had done, various worked flints, some of them like those discovered by M. Riviere in the caves of southern France; thence he went up the Nile to Luxor, the site of ancient Thebes, began a thorough search in the Tertiary limestone hills, and found multitudes of chipped stone implements, some of them, indeed, of original forms, but most of forms common in other parts of the world under similar circumstances, some of the chipped stone axes corresponding closely to those found in the drift beds of northern France.

All this seemed to show conclusively that, long ages before the earliest period of Egyptian civilization of which the monuments of the first dynasties give us any trace, mankind in the Nile Valley was going through the same slow progress from the period when, standing just above the brutes, he defended himself with implements of rudely

chipped stone.

But in 1881 came discoveries which settled the question entirely. In that year General Pitt Rivers, a Fellow of the Royal Society and President of the Anthropological Institute, and J. F. Campbell, Fellow of the Royal Geographical Society of England, found implements not only in alluvial deposits, associated with the bones of the zebra, hyena, and other animals which have since retreated farther south, but, at Djebel Assas, near Thebes, they found implements of chipped flint in the hard, stratified gravel, from six and a half to ten feet below the surface; relics evidently, as Mr. Campbell says, "beyond calculation older than the oldest Egyptian temples and tombs." They certainly proved that Egyptian civilization had not issued in its completeness, and all at once, from the hand of the Creator in the time of Mena. Nor was this all. Investigators of the highest character and ability men like Hull and Flinders Petrie revealed geological changes in Egypt requiring enormous periods of time, and traces of man's

handiwork dating from a period when the waters in the Nile Valley extended hundreds of feet above the present level. Thus was ended the contention of Mr. Southall.

Still another attack upon the new scientific conclusions came from France, when in 1883 the Abbe Hamard, Priest of the Oratory, published his Age of Stone and Primitive Man. He had been especially vexed at the arrangement of prehistoric implements by periods at the Paris Exposition of 1878; he bitterly complains of this as having an anti Christian tendency, and rails at science as "the idol of the day." He attacks Mortillet, one of the leaders in French archaeology, with a great display of contempt; speaks of the "venom" in books on prehistoric man generally; complains that the Church is too mild and gentle with such monstrous doctrines; bewails the concessions made to science by some eminent preachers; and foretells his own martyrdom at the hands of men of science.

Efforts like this accomplished little, and a more

legitimate attempt was made to resist the conclusions of archaeology by showing that knives of stone were used in obedience to a sacred ritual in Egypt for embalming, and in Judea for circumcision, and that these flint knives might have had this later origin. But the argument against the conclusions drawn from this view was triple: First, as we have seen, not only stone knives, but axes and other implements of stone similar to those of a prehistoric period in western Europe were discovered; secondly, these implements were discovered in the hard gravel drift of a period evidently far earlier than that of Mena; and, thirdly, the use of stone implements in Egyptian and Jewish sacred functions within the historic period, so far from weakening the force of the arguments for the long and slow development of Egyptian civilization from the men who used rude flint implements to the men who built and adorned the great temples of the early dynasties, is really an argument in favour of that long evolution. A study of comparative ethnology has made it clear that the sacred

stone knives and implements of the Egyptian and Jewish priestly ritual were natural survivals of that previous period. For sacrificial or ritual purposes, the knife of stone was considered more sacred than the knife of bronze or iron, simply because it was ancient; just as to day, in India, Brahman priests kindle the sacred fire not with matches or flint and steel, but by a process found in the earliest, lowest stages of human culture by violently boring a pointed stick into another piece of wood until a spark comes; and just as to day, in Europe and America, the architecture of the Middle Ages survives as a special religious form in the erection of our most recent churches, and to such an extent that thousands on thousands of us feel that we can not worship fitly unless in the midst of windows, decorations, vessels, implements, vestments, and ornaments, no longer used for other purposes, but which have survived in sundry branches of the Christian Church, and derived a special sanctity from the fact that they are of ancient origin.

Taking, then, the whole mass of testimony together,

even though a plausible or very strong argument against single evidences may be made here and there, the force of its combined mass remains, and leaves both the vast antiquity of man and the evolution of civilization from its lowest to its highest forms, as proved by the prehistoric remains of Egypt and so many other countries in all parts of the world, beyond a reasonable doubt. Most important of all, the recent discoveries in Assyria have thrown a new light upon the evolution of the dogma of "the fall of man." Reverent scholars like George Smith, Sayce, Delitzsch, Jensen, Schrader, and their compeers have found in the Ninevite records the undoubted source of that form of the fall legend which was adopted by the Hebrews and by them transmitted to Christianity.

CHAPTER IX. THE "FALL OF MAN" AND ETHNOLOGY.

We have seen that, closely connected with the main lines of investigation in archaeology and anthropology, there were other researches throwing much light on the entire subject. In a previous chapter we saw especially that Lafitau and Jussieu were among the first to collect and compare facts bearing on the natural history of man, gathered by travellers in various parts of the earth, thus laying foundations for the science of comparative ethnology. It was soon seen that ethnology had most important bearings upon the question of the material, intellectual, moral, and religious evolution of the human race; in every civilized nation, therefore, appeared scholars who began to study the characteristics of various groups of men as ascertained from travellers, and to compare the results thus gained with each other and with those obtained by archaeology.

Thus, more and more clear became the evidences that the tendency of the race has been upward from low beginnings. It was found that groups of men still existed possessing characteristics of those in the early periods of development to whom the drift and caves and shell heaps and pile dwellings bear witness; groups of men using many of the same implements and weapons, building their houses in the same way, seeking their food by the same means, enjoying the same amusements, and going through the same general stages of culture; some being in a condition corresponding to the earlier, some to the later, of those early periods.

From all sides thus came evidence that we have still upon the earth examples of all the main stages in the development of human civilization; that from the period when man appears little above the brutes, and with little if any religion in any accepted sense of the word, these examples can be arranged in an ascending series leading to the highest planes which humanity has reached; that

philosophic observers may among these examples study existing beliefs, usages, and institutions back through earlier and earlier forms, until, as a rule, the whole evolution can be easily divined if not fully seen. Moreover, the basis of the whole structure became more and more clear: the fact that "the lines of intelligence have always been what they are, and have always operated as they do now; that man has progressed from the simple to the complex, from the particular to the general."

As this evidence from ethnology became more and more strong, its significance to theology aroused attention, and naturally most determined efforts were made to break its force. On the Continent the two great champions of the Church in this field were De Maistre and De Bonald; but the two attempts which may be especially recalled as the most influential among English speaking peoples were those of Whately, Archbishop of Dublin, and the Duke of Argyll.

First in the combat against these new deductions of

science was Whately. He was a strong man, whose breadth of thought and liberality in practice deserve all honour; but these very qualities drew upon him the distrust of his orthodox brethren; and, while his writings were powerful in the first half of the present century to break down many bulwarks of unreason, he seems to have been constantly in fear of losing touch with the Church, and therefore to have promptly attacked some scientific reasonings, which, had he been a layman, not holding a brief for the Church, he would probably have studied with more care and less prejudice. He was not slow to see the deeper significance of archaeology and ethnology in their relations to the theological conception of "the Fall," and he set the battle in array against them.

His contention was, to use his own words, that "no community ever did or ever can emerge unassisted by external helps from a state of utter barbarism into anything that can be called civilization"; and that, in short, all imperfectly civilized, barbarous, and savage races are but

fallen descendants of races more fully civilized. This view was urged with his usual ingenuity and vigour, but the facts proved too strong for him: they made it clear, first, that many races were without simple possessions, instruments, and arts which never, probably, could have been lost if once acquired as, for example, pottery, the bow for shooting, various domesticated animals, spinning, the simplest principles of agriculture, household economy, and the like; and, secondly, it was shown as a simple matter of fact that various savage and barbarous tribes HAD raised themselves by a development of means which no one from outside could have taught them; as in the cultivation and improvement of various indigenous plants, such as the potato and Indian corn among the Indians of North America; in the domestication of various animals peculiar to their own regions, such as the llama among the Indians of south America; in the making of sundry fabrics out of materials and by processes not found among other nations, such as the bark cloth of the Polynesians; and in the

development of weapons peculiar to sundry localities, but known in no others, such as the boomerang in Australia.

Most effective in bringing out the truth were such works as those of Sir John Lubbock and Tylor; and so conclusive were they that the arguments of Whately were given up as untenable by the other of the two great champions above referred to, and an attempt was made by him to form the diminishing number of thinking men supporting the old theological view on a new line of defence.

This second champion, the Duke of Argyll, was a man of wide knowledge and strong powers in debate, whose high moral sense was amply shown in his adhesion to the side of the American Union in the struggle against disunion and slavery, despite the overwhelming majority against him in the high aristocracy to which he belonged. As an honest man and close thinker, the duke was obliged to give up completely the theological view of the antiquity of man. The whole biblical chronology as held by the universal

Church, "always, everywhere, and by all," he sacrificed, and gave all his powers in this field to support the theory of "the Fall." Noblesse oblige: the duke and his ancestors had been for centuries the chief pillars of the Church of Scotland, and it was too much to expect that he could break away from a tenet which forms really its "chief cornerstone."

Acknowledging the insufficiency of Archbishop Whately's argument, the duke took the ground that the lower, barbarous, savage, brutal races were the remains of civilized races which, in the struggle for existence, had been pushed and driven off to remote and inclement parts of the earth, where the conditions necessary to a continuance in their early civilization were absent; that, therefore, the descendants of primeval, civilized men degenerated and sank in the scale of culture. To use his own words, the weaker races were "driven by the stronger to the woods and rocks," so that they became "mere outcasts of the human race."

In answer to this, while it was conceded, first, that there have been examples of weaker tribes sinking in the scale of culture after escaping from the stronger into regions unfavourable to civilization, and, secondly, that many powerful nations have declined and decayed, it was shown that the men in the most remote and unfavourable regions have not always been the lowest in the scale; that men have been frequently found "among the woods and rocks" in a higher state of civilization than on the fertile plains, such examples being cited as Mexico, Peru, and even Scotland; and that, while there were many examples of special and local decline, overwhelming masses of facts point to progress as a rule.

The improbability, not to say impossibility, of many of the conclusions arrived at by the duke appeared more and more strongly as more became known of the lower tribes of mankind. It was necessary on his theory to suppose many things which our knowledge of the human race absolutely forbids us to believe: for example, it was necessary to

suppose that the Australians or New Zealanders, having once possessed so simple and convenient an art as that of the potter, had lost every trace of it; and that the same tribes, having once had so simple a means of saving labour as the spindle or small stick weighted at one end for spinning, had given it up and gone back to twisting threads with the hand. In fact, it was necessary to suppose that one of the main occupations of man from "the beginning" had been the forgetting of simple methods, processes, and implements which all experience in the actual world teaches us are never entirely forgotten by peoples who have once acquired them.

Some leading arguments of the duke were overthrown by simple statements of fact. Thus, his instance of the Eskimo as pushed to the verge of habitable America, and therefore living in the lowest depths of savagery, which, even if it were true, by no means proved a general rule, was deprived of its force by the simple fact that the Eskimos are by no means the lowest race on the American continent,

and that various tribes far more centrally and advantageously placed, as, for instance, those in Brazil, are really inferior to them in the scale of culture. Again, his statement that "in Africa there appear to be no traces of any time when the natives were not acquainted with the use of iron," is met by the fact that from the Nile Valley to the Cape of Good Hope we find, wherever examination has been made, the same early stone implements which in all other parts of the world precede the use of iron, some of which would not have been made had their makers possessed iron. The duke also tried to show that there were no distinctive epochs of stone, bronze, and iron, by adducing the fact that some stone implements are found even in some high civilizations. This is indeed a fact. We find some few European peasants to day using stone mallet heads; but this proves simply that the old stone mallet heads have survived as implements cheap and effective.

The argument from Comparative Ethnology in support of the view that the tendency of mankind is upward has

received strength from many sources. Comparative Philology shows that in the less civilized, barbarous, and savage races childish forms of speech prevail frequent reduplications and the like, of which we have survivals in the later and even in the most highly developed languages. In various languages, too, we find relics of ancient modes of thought in the simplest words and expressions used for arithmetical calculations. Words and phrases for this purpose are frequently found to be derived from the words for hands, feet, fingers, and toes, just as clearly as in our own language some of our simplest measures of length are shown by their names to have been measures of parts of the human body, as the cubit, the foot, and the like, and therefore to date from a time when exactness was not required. To add another out of many examples, it is found to day that various rude nations go through the simplest arithmetical processes by means of pebbles. Into our own language, through the Latin, has come a word showing that our distant progenitors reckoned in this way: the word

CALCULATE gives us an absolute proof of this. According to the theory of the Duke of Argyll, men ages ago used pebbles (CALCULI) in performing the simplest arithmetical calculations because we to day "CALCULATE." No reduction to absurdity could be more thorough. The simple fact must be that we "calculate" because our remote ancestors used pebbles in their arithmetic.

Comparative Literature and Folklore also show among peoples of a low culture to day childish modes of viewing nature, and childish ways of expressing the relations of man to nature, such as clearly survive from a remote ancestry; noteworthy among these are the beliefs in witches and fairies, and multitudes of popular and poetic expressions in the most civilized nations.

So,too, Comparative Ethnography, the basis of Ethnology, shows in contemporary barbarians and savages a childish love of playthings and games, of which we have many survivals.

All these facts, which were at first unobserved or observed as matters of no significance, have been brought into connection with a fact in biology acknowledged alike by all important schools; by Agassiz on one hand and by Darwin on the other namely, as stated by Agassiz, that "the young states of each species and group resemble older forms of the same group," or, as stated by Darwin, that "in two or more groups of animals, however much they may at first differ from each other in structure and habits, if they pass through closely similar embryonic stages, we may feel almost assured that they have descended from the same parent form, and are therefore closely related."

CHAPTER X. THE "FALL OF MAN" AND HISTORY.

The history of art, especially as shown by architecture, in the noblest monuments of the most enlightened nations of antiquity; gives abundant proofs of the upward tendency of man from the rudest and simplest beginnings. Many columns of early Egyptian temples or tombs are but bundles of Nile reeds slightly conventionalized in stone; the temples of Greece, including not only the earliest forms, but the Parthenon itself, while in parts showing an evolution out of Egyptian and Assyrian architecture, exhibit frequent reminiscences and even imitations of earlier constructions in wood; the medieval cathedrals, while evolved out of Roman and Byzantine structures, constantly show unmistakable survivals of prehistoric construction.

So, too, general history has come in, illustrating the unknown from the known: the development of man in the

prehistoric period from his development within historic times. Nothing is more evident from history than the fact that weaker bodies of men driven out by stronger do not necessarily relapse into barbarism, but frequently rise, even under the most unfavourable circumstances, to a civilization equal or superior to that from which they have been banished. Out of very many examples showing this law of upward development, a few may be taken as typical. The Slavs, who sank so low under the pressure of stronger races that they gave the modern world a new word to express the most hopeless servitude, have developed powerful civilizations peculiar to themselves; the, barbarian tribes who ages ago took refuge amid the sand banks and morasses of Holland, have developed one of the world's leading centres of civilization; the wretched peasants who about the fifth century took refuge from invading hordes among the lagoons and mud banks of Venetia, developed a power in art, arms, and politics which is among the wonders of human history; the Puritans, driven from

the civilization of Great Britain to the unfavourable climate, soil, and circumstances of early New England, the Huguenots, driven from France, a country admirably fitted for the highest growth of civilization, to various countries far less fitted for such growth, the Irish peasantry, driven in vast numbers from their own island to other parts of the world on the whole less fitted to them all are proofs that, as a rule, bodies of men once enlightened, when driven to unfavourable climates and brought under the most depressing circumstances, not only retain what enlightenment they have, but go on increasing it. Besides these, we have such cases as those of criminals banished to various penal colonies, from whose descendants has been developed a better morality; and of pirates, like those of the Bounty, whose descendants, in a remote Pacific island, became sober, steady citizens. Thousands of examples show the prevalence of this same rule that men in masses do not forget the main gains of their civilization, and that, in spite of deteriorations,

their tendency is upward.

Another class of historic facts also testifies in the most striking manner to this same upward tendency: the decline and destruction of various civilizations brilliant but hopelessly vitiated. These catastrophes are seen more and more to be but steps in, this development. The crumbling away of the great ancient civilizations based upon despotism, whether the despotism of monarch, priest, or mob the decline and fall of Roman civilization, for example, which, in his most remarkable generalization, Guizot has shown to have been necessary to the development of the richer civilization of modern Europe; the terrible struggle and loss of the Crusades, which once appeared to be a mere catastrophe, but are now seen to have brought in, with the downfall of feudalism, the beginnings of the centralizing, civilizing monarchical period; the French Revolution, once thought a mere outburst of diabolic passion, but now seen to be an unduly delayed transition from the monarchical to the constitutional epoch: all show that even

widespread deterioration and decline often, indeed, the greatest political and moral catastrophes so far from leading to a fall of mankind, tend in the long run to raise humanity to higher planes.

Thus, then, Anthropology and its handmaids, Ethnology, Philology, and History, have wrought out, beyond a doubt, proofs of the upward evolution of humanity since the appearance of man upon our planet.

Nor have these researches been confined to progress in man's material condition. Far more important evidences have been found of upward evolution in his family, social, moral, intellectual, and religious relations. The light thrown on this subject by such men as Lubbock, Tylor, Herbert Spencer, Buckle, Draper, Max Muller, and a multitude of others, despite mistakes, haltings, stumblings, and occasional following of delusive paths, is among the greatest glories of the century now ending. From all these investigators in their various fields, holding no brief for any system sacred or secular, but seeking truth as truth,

comes the same general testimony of the evolution of higher out of lower. The process has been indeed slow and painful, but this does not prove that it may not become more rapid and less fruitful in sorrow as humanity goes on.

While, then, it is not denied that many instances of retrogression can be found, the consenting voice of unbiased investigators in all lands has declared more and more that the beginnings of our race must have been low and brutal, and that the tendency has been upward. To combat this conclusion by examples of decline and deterioration here and there has become impossible: as well try to prove that, because in the Mississippi there are eddies in which the currents flow northward, there is no main stream flowing southward; or that, because trees decay and fall, there is no law of upward growth from germ to trunk, branches, foliage, and fruit.

A very striking evidence that the theological theory had become untenable was seen when its main supporter in the scientific field, Von Martius, in the full ripeness of his

powers, publicly declared his conversion to the scientific view.

Yet, while the tendency of enlightened human thought in recent times is unmistakable, the struggle against the older view is not yet ended. The bitterness of the Abbe Hamard in France has been carried to similar and even greater extremes among sundry Protestant bodies in Europe and America. The simple truth of history mates it a necessity, unpleasant though it be, to chronicle two typical examples in the United States.

In the year 1875 a leader in American industrial enterprise endowed at the capital of a Southern State a university which bore his name. It was given into the hands of one of the religious sects most powerful in that region, and a bishop of that sect became its president. To its chair of Geology was called Alexander Winchell, a scholar who had already won eminence as a teacher and writer in that field, a professor greatly beloved and respected in the two universities with which he had been connected, and a

member of the sect which the institution of learning above referred to represented.

But his relations to this Southern institution were destined to be brief. That his lectures at the Vanderbilt University were learned, attractive, and stimulating, even his enemies were forced to admit; but he was soon found to believe that there had been men earlier than the period as signed to Adam, and even that all the human race are not descended from Adam. His desire was to reconcile science and Scripture, and he was now treated by a Methodist Episcopal Bishop in Tennessee just as, two centuries before, La Peyrere had been treated, for a similar effort, by a Roman Catholic vicar general in Belgium. The publication of a series of articles on the subject, contributed by the professor to a Northern religious newspaper at its own request, brought matters to a climax; for, the articles having fallen under the notice of a leading Southwestern organ of the denomination controlling the Vanderbilt University, the result was a most bitter denunciation of Prof.

Winchell and of his views. Shortly afterward the professor was told by Bishop McTyeire that "our people are of the opinion that such views are contrary to the plan of redemption," and was requested by the bishop to quietly resign his chair. To this the professor made the fitting reply: "If the board of trustees have the manliness to dismiss me for cause, and declare the cause, I prefer that they should do it. No power on earth could persuade me to resign."

"We do not propose," said the bishop, with quite gratuitous suggestiveness, "to treat you as the Inquisition treated Galileo."

"But what you propose is the same thing," rejoined Dr. Winchell. "It is ecclesiastical proscription for an opinion which must be settled by scientific evidence."

Twenty four hours later Dr. Winchell was informed that his chair had been abolished, and its duties, with its salary, added to those of a colleague; the public were given to understand that the reasons were purely economic; the

banished scholar was heaped with official compliments, evidently in hope that he would keep silence.

Such was not Dr. Winchell's view. In a frank letter to the leading journal of the university town he stated the whole matter. The intolerance hating press of the country, religious and secular, did not hold its peace. In vain the authorities of the university waited for the storm to blow over. It was evident, at last, that a defence must be made, and a local organ of the sect, which under the editorship of a fellow professor had always treated Dr. Winchell's views with the luminous inaccuracy which usually characterizes a professor's ideas of a rival's teachings, assumed the task. In the articles which followed, the usual scientific hypotheses as to the creation were declared to be "absurd," "vague and unintelligible," "preposterous and gratuitous." This new champion stated that "the objections drawn from the fossiliferous strata and the like are met by reference to the analogy of Adam and Eve, who presented the phenomena of adults when they were but a day old, and by the Flood of

Noah and other cataclysms, which, with the constant change of Nature, are sufficient to account for the phenomena in question"!

Under inspiration of this sort the Tennessee Conference of the religious body in control of the university had already, in October, 1878, given utterance to its opinion of unsanctified science as follows: "This is an age in which scientific atheism, having divested itself of the habiliments that most adorn and dignify humanity, walks abroad in shameless denudation. The arrogant and impertinent claims of this ‘science, falsely so called,’ have been so boisterous and persistent, that the unthinking mass have been sadly deluded; but our university alone has had the courage to lay its young but vigorous hand upon the mane of untamed Speculation and say, ‘We will have no more of this.’" It is a consolation to know how the result, thus devoutly sought, has been achieved; for in the "ode" sung at the laying of the corner stone of a new theological building of the same university, in May, 1880, we read:

"Science and Revelation here In perfect harmony appear, Guiding young feet along the road Through grace and Nature up to God."

It is also pleasing to know that, while an institution calling itself a university thus violated the fundamental principles on which any institution worthy of the name must be based, another institution which has the glory of being the first in the entire North to begin something like a university organization the State University of Michigan recalled Dr. Winchell at once to his former professorship, and honoured itself by maintaining him in that position, where, unhampered, he was thereafter able to utter his views in the midst of the largest body of students on the American Continent.

Disgraceful as this history was to the men who drove out Dr. Winchell, they but succeeded, as various similar bodies of men making similar efforts have done, in advancing their supposed victim to higher position and more commanding influence.

A few years after this suppression of earnest Christian thought at an institution of learning in the western part of our Southern States, there appeared a similar attempt in sundry seaboard States of the South.

As far back as the year 1857 the Presbyterian Synod of Mississippi passed the following resolution:

"WHEREAS, We live in an age in which the most insidious attacks are made on revealed religion through the natural sciences, and as it behooves the Church at all times to have men capable of defending the faith once delivered to the saints;

"RESOLVED, That this presbytery recommend the endowment of a professorship of Natural Science as connected with revealed religion in one or more of our theological seminaries."

Pursuant to this resolution such a chair was established in the theological seminary at Columbia, S.C., and James Woodrow was appointed professor. Dr. Woodrow seems to have been admirably fitted for the position a devoted

Christian man, accepting the Presbyterian standards of faith in which he had been brought up, and at the same time giving every effort to acquaint himself with the methods and conclusions of science. To great natural endowments he added constant labours to arrive at the truth in this field. Visiting Europe, he made the acquaintance of many of the foremost scientific investigators, became a student in university lecture rooms and laboratories, an interested hearer in scientific conventions, and a correspondent of leading men of science at home and abroad. As a result, he came to the conclusion that the hypothesis of evolution is the only one which explains various leading facts in natural science. This he taught, and he also taught that such a view is not incompatible with a true view of the sacred Scriptures.

In 1882 and 1883 the board of directors of the theological seminary, in fear that "scepticism in the world is using alleged discoveries in science to impugn the Word of God," requested Prof. Woodrow to state his views in regard

to evolution. The professor complied with this request in a very powerful address, which was published and widely circulated, to such effect that the board of directors shortly afterward passed resolutions declaring the theory of evolution as defined by Prof. Woodrow not inconsistent with perfect soundness in the faith.

In the year 1884 alarm regarding Dr. Woodrow's teachings began to show itself in larger proportions, and a minority report was introduced into the Synod of South Carolina declaring that "the synod is called upon to decide not upon the question whether the said views of Dr. Woodrow contradict the Bible in its highest and absolute sense, but upon the question whether they contradict the interpretation of the Bible by the Presbyterian Church in the United States."

Perhaps a more self condemnatory statement was never presented, for it clearly recognized, as a basis for intolerance, at least a possible difference between "the interpretation of the Bible by the Presbyterian Church" and

the teachings of "the Bible in its highest and absolute sense."

This hostile movement became so strong that, in spite of the favourable action of the directors of the seminary, and against the efforts of a broad minded minority in the representative bodies having ultimate charge of the institution, the delegates from the various synods raised a storm of orthodoxy and drove Dr. Woodrow from his post. Happily, he was at the same time professor in the University of South Carolina in the same city of Columbia, and from his chair in that institution he continued to teach natural science with the approval of the great majority of thinking men in that region; hence, the only effect of the attempt to crush him was, that his position was made higher, respect for him deeper, and his reputation wider.

In spite of attempts by the more orthodox to prevent students of the theological seminary from attending his lectures at the university, they persisted in hearing him; indeed, the reputation of heresy seemed to enhance his

influence.

It should be borne in mind that the professor thus treated had been one of the most respected and beloved university instructors in the South during more than a quarter of a century, and that he was turned out of his position with no opportunity for careful defence, and, indeed, without even the formality of a trial. Well did an eminent but thoughtful divine of the Southern Presbyterian Church declare that "the method of procedure to destroy evolution by the majority in the Church is vicious and suicidal," and that "logical dynamite has been used to put out a supposed fire in the upper stories of our house, and all the family in the house at that." Wisely, too, did he refer to the majority as "sowing in the fields of the Church the thorns of its errors, and cumbering its path with the debris and ruin of its own folly."

To these recent cases may be added the expulsion of Prof. Toy from teaching under ecclesiastical control at Louisville, and his election to a far more influential chair at

Harvard University; the driving out from the American College at Beyrout of the young professors who accepted evolution as probable, and the rise of one of them, Mr. Nimr, to a far more commanding position than that which he left the control of three leading journals at Cairo; the driving out of Robertson Smith from his position at Edinburgh, and his reception into the far more important and influential professorship at the English University of Cambridge; and multitudes of similar cases. From the days when Henry Dunster, the first President of Harvard College, was driven from his presidency, as Cotton Mather said, for "falling into the briers of Antipedobaptism" until now, the same spirit is shown in all such attempts. In each we have generally, on one side, a body of older theologians, who since their youth have learned nothing and forgotten nothing, sundry professors who do not wish to rewrite their lectures, and a mass of unthinking ecclesiastical persons of little or no importance save in making up a retrograde majority in an ecclesiastical tribunal; on the other side we

have as generally the thinking, open minded, devoted men who have listened to the revelation of their own time as well as of times past, and who are evidently thinking the future thought of the world.

Here we have survivals of that same oppression of thought by theology which has cost the modern world so dear; the system which forced great numbers of professors, under penalty of deprivation, to teach that the sun and planets revolve about the earth; that comets are fire balls flung by an angry God at a wicked world; that insanity is diabolic possession; that anatomical investigation of the human frame is sin against the Holy Ghost; that chemistry leads to sorcery; that taking interest for money is forbidden by Scripture; that geology must conform to ancient Hebrew poetry. From the same source came in Austria the rule of the "Immaculate Oath," under which university professors, long before the dogma of the Immaculate Conception was defined by the Church, were obliged to swear to their belief in that dogma before they were permitted to teach

even arithmetic or geometry; in England, the denunciation of inoculation against smallpox; in Scotland, the protests against using chloroform in childbirth as "vitiating the primal curse against woman"; in France, the use in clerical schools of a historical text book from which Napoleon was left out; and, in America, the use of Catholic manuals in which the Inquisition is declared to have been a purely civil tribunal, or Protestant manuals in which the Puritans are shown to have been all that we could now wish they had been.

So, too, among multitudes of similar efforts abroad, we have during centuries the fettering of professors at English and Scotch universities by test oaths, subscriptions to articles, and catechisms without number. In our own country we have had in a vast multitude of denominational colleges, as the first qualification for a professorship, not ability in the subject to be taught, but fidelity to the particular shibboleth of the denomination controlling the college or university.

Happily, in these days such attempts generally defeat themselves. The supposed victim is generally made a man of mark by persecution, and advanced to a higher and wider sphere of usefulness. In withstanding the march of scientific truth, any Conference, Synod, Board of Commissioners, Board of Trustees, or Faculty, is but as a nest of field mice in the path of a steam plough.

The harm done to religion in these attempts is far greater than that done to science; for thereby suspicions are widely spread, especially among open minded young men, that the accepted Christian system demands a concealment of truth, with the persecution of honest investigators, and therefore must be false. Well was it said in substance by President McCosh, of Princeton, that no more sure way of making unbelievers in Christianity among young men could be devised than preaching to them that the doctrines arrived at by the great scientific thinkers of this period are opposed to religion.

Yet it is but justice here to say that more and more

there is evolving out of this past history of oppression a better spirit, which is making itself manifest with power in the leading religious bodies of the world. In the Church of Rome we have to day such utterances as those of St. George Mivart, declaring that the Church must not attempt to interfere with science; that the Almighty in the Galileo case gave her a distinct warning that the priesthood of science must remain with the men of science. In the Anglican Church and its American daughter we have the acts and utterances of such men as Archbishop Tait, Bishop Temple, Dean Stanley, Dean Farrar, and many others, proving that the deepest religious thought is more and more tending to peace rather than warfare with science; and in the other churches, especially in America, while there is yet much to be desired, the welcome extended in many of them to Alexander Winchell, and the freedom given to views like his, augur well for a better state of things in the future.

From the science of Anthropology, when rightly viewed as a whole, has come the greatest aid to those who

work to advance religion rather than to promote any particular system of theology; for Anthropology and its subsidiary sciences show more and more that man, since coming upon the earth, has risen, from the period when he had little, if any, idea of a great power above him, through successive stages of fetichism, shamanism, and idolatry, toward better forms of belief, making him more and more accessible to nobler forms of religion. The same sciences show, too, within the historic period, the same tendency, and especially within the events covered by our sacred books, a progress from fetichism, of which so many evidences crop out in the early Jewish worship as shown in the Old Testament Scriptures, through polytheism, when Jehovah was but "a god above all gods," through the period when he was "a jealous God," capricious and cruel, until he is revealed in such inspired utterances as those of the nobler Psalms, the great passages in Isaiah, the sublime preaching of Micah, and, above all, through the ideal given to the world by Jesus of Nazareth.

Well indeed has an eminent divine of the Church of England in our own time called on Christians to rejoice over this evolution, "between the God of Samuel, who ordered infants to be slaughtered, and the God of the Psalmist, whose tender mercies are over all his works; between the God of the Patriarchs, who was always repenting, and the God of the Apostles, who is the same yesterday, to day, and forever, with whom there is no variableness nor shadow of turning, between the God of the Old Testament, who walked in the garden in the cool of the day, and the God of the New Testament, whom no man hath seen nor can see; between the God of Leviticus, who was so particular about the sacrificial furniture and utensils, and the God of the Acts, who dwelleth not in temples made with hands; between the God who hardened Pharaoh's heart, and the God who will have all men to be saved; between the God of Exodus, who is merciful only to those who love him, and the God of Christ the heavenly Father who is kind unto the unthankful and the evil."

However overwhelming, then, the facts may be which Anthropology, History, and their kindred sciences may, in the interest of simple truth, establish against the theological doctrine of "the Fall"; however completely they may fossilize various dogmas, catechisms, creeds, confessions, "plans of salvation" and "schemes of redemption," which have been evolved from the great minds of the theological period: science, so far from making inroads on religion, or even upon our Christian development of it, will strengthen all that is essential in it, giving new and nobler paths to man's highest aspirations. For the one great, legitimate, scientific conclusion of anthropology is, that, more and more, a better civilization of the world, despite all its survivals of savagery and barbarism, is developing men and women on whom the declarations of the nobler Psalms, of Isaiah, of Micah, the Sermon on the Mount, the first great commandment, and the second, which is like unto it, St. Paul's praise of charity and St. James's definition of "pure religion and undefiled," can take stronger hold for the

more effective and more rapid uplifting of our race.