

THE  
CHRONOLOGY OF CREATION;  
OR,  
GEOLOGY AND SCRIPTURE  
RECONCILED.

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"One generation shall praise thy works to another, and shall declare thy mighty acts.  
"I will speak of the glorious honour of thy majesty, and of thy wondrous works.  
"And ~~men~~ shall speak of the might of thy terrible acts: and I will declare thy  
greatness."—*Psalms* cxlv. v. 4, 5 and 6.  
"Prove all things; hold fast that which is good."—*1 Thess.* v. v. 21.



BY  
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Captain, Bengal Army.

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1850.

TO THE  
HONORABLE THE COURT OF DIRECTORS  
OF THE  
HONORABLE EAST INDIA COMPANY,  
THIS WORK  
*IS RESPECTFULLY DEDICATED,*  
BY THEIR GRATEFUL AND OBEDIENT SERVANT,  
THE AUTHOR.



## PREFACE.

HORACE recommends that an author should take nine years to weigh and reconsider the subject-matter of his work; and no doubt, in general, the advice would be sound, if a man could only make sure of living so long. We have even gone beyond the term assigned, and yet are modest enough to believe that a longer time would have added materially to the value of our labours. Some, perhaps, may even deem it matter of regret that the work was not postponed *sine die*; but from them we beg leave to differ,—no man, however dim and imperfect it may be, having a right to hide his light under a bushel; but, on the

contrary, in all matters where truth is the object at stake, he is bound, both by his duty to God and to his fellow men, to make that light apparent, leaving it to the judgment of others to accept or reject his doctrines.

“ Systems approach perfection by degrees: and he who produces one, facilitates the production of a better. He also who makes the first attempt is not to be envied: since all are as ready to censure its defects, as they are able to see what the author himself points out, choosing to forget that he has done so, while ignorant or neglectful of what has been done and what overcome. The traveller over a solid road knows nothing of the toil that first laid it on the quaking morass, and as little does he care; while he is enraged at the casual rut. But though such a system should teach nothing, it would be valuable by the display of its own defects. No chasm can be filled till it is known: while thus are errors and blanks classed with the nearest truths, so as to indicate the way by which they are to be corrected and supplied. All sciences commence with error; and he who waits for the hour of perfection, suppressing what

he knows, because too proud or too timid to confess a pardonable ignorance, is the *Σχολαστικός* who will not enter the water till he can swim. Nor will the day of truth ever arrive, if they who can add to the stock of knowledge confine it within themselves."\*

The foundation of the present work was laid in 1837, when the author first had an opportunity of perusing Dr. Buckland's *Bridgewater Treatise*, a work which, while it cannot be too highly commended for all that relates to the description of fossil organic remains, is, as a theory, next to useless. Impressed with this idea, yet convinced that Geology and Scripture were capable of being reconciled; and bearing in mind that in 1834, the Council of the Royal Society had invited "contributions towards a system of geological chronology, founded on the examination of fossil remains and their attendant phenomena," the author commenced the task, which he has here brought to a close. How that task has been performed, it is for the reader to decide,—but an apology may perhaps be

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\* MacCulloch's *System of Geology*—Preface.

due for those imperfections of style and inelegancies of language, which no doubt abound, and which the "rough and ready" mode of military life in India is ill calculated to correct. Nevertheless, as truth, whether clad in the homely language of the labouring man, or arrayed in the high sounding jargon of modern science, must still be truth, the author ventures now to submit his book to the judgment and indulgence of a discerning public.



# CONTENTS.

---

## CHAPTER I.

	<i>Page.</i>
Figure of the Earth; primeval state of fluidity; heavy matter collected at the centre; nebular hypothesis refuted; aqueous origin of the Earth .....	1

## CHAPTER II.

The foregoing doctrines compared with Scripture; Granville Penn's proposed amendment of Genesis proved unnecessary; invectives against the Neptunists uncalled for; proof of the chaotic condition of the primeval elements of the Earth; no Mountains during The Beginning; erroneous views of Dr. Buckland; the Earth not derived from the "wreck and ruin" of a former world; fossiliferous strata deposited subsequent to the First Day of Scripture; old editions of the Bible not divided into verses; great duration of the period styled "The Beginning," proved from Astronomy .....	31
---	----

## CHAPTER III.

Certain conditions necessary before animal life could appear; Heat; Evaporation; Atmosphere; Daylight; creation of the material elements of the various members of the solar system, contemporaneous; the Sun, the principal source of heat; Daylight, an effect of atmospheric action on the solar ray .....	72
---	----



## CHAPTER IV.

	<i>Page.</i>
Creation of light; objections answered; contradictions of authors; visibility of latent light due to the existence of the atmosphere; reasons why the Sun may not have been apparent on the first day; proofs that the Sun was in existence on the first day; agreement of the foregoing doctrines with the Holy Scriptures .....	81

## CHAPTER V.

Operation of the second day; state of the Earth at the end of the first day; formation of the Firmament; the result of natural laws; correctness of the Scriptural accounts; meaning of the word Firmament .. ...	97
---	----

## CHAPTER VI.

Phenomena of the primary rocks considered; stratification referred to the agency of water; amorphous rocks of igneous origin; agency of water and heat perceptible; the agency of water preceded that of heat; granite of igneous origin; volcanic agency apparent; conclusions to be drawn from the preceding facts .....	104
--	-----

## CHAPTER VII.

Conjectures as to the means by which dry land was produced; supposed density of the internal portion of the Earth; supposed fusion of the central portion; primeval waters drained into depressions on the surface; elevation of land simultaneous with depression at the antipodes .....	118
---	-----

## CHAPTER VIII.

Central deposits necessarily unstratified; probably composed of the metallic bases of the earths and alkalies; volcanic action	
--	--

CONTENTS.

xi

*Page.*

engendered at the centre; producing elevation and depression of strata; subsidence of water and production of dry land; depression of one surface shown to be a natural consequence of the eruption of matter in an opposite direction; stratification of the lower rocks obliterated by the proximity of fused volcanic matter; probable origin of primary limestone ..... 132

CHAPTER IX.

Review of the foregoing remarks; enormous pressure of the atmosphere; sequence of events proved to be natural; volcanic effects of water admitted to the heated centre; conditions necessary to produce an earthquake; volcanos serve as channels for the escape of internal heat; land and water placed at the antipodes of each other; formation of boulders and erratic blocks; the rugged outline of primary mountains caused by sudden refrigeration and exfoliation; formation of non-fossiliferous or cumbrian slates ..... 139

CHAPTER X.

Theory of an internal abyss irreconcilable with facts; truth of the Scriptural statements proved; creation of the vegetable kingdom ..... 156

CHAPTER XI.

Various opinions regarding the period of the creation of the Heavenly bodies; supposition that they were created on the fourth day, not supported by Scripture; reasons why not apparent till the fourth day; sequence of recorded events proved to be true and natural; proof of the creation of the Heavenly bodies on the first day; their creation on the fourth day refuted ..... 165

CHAPTER XII.

Creation of the feathered and aquatic tribes; creation of mammalia and other terrestrial classes of animals ..... 175

## CHAPTER XIII.

	<i>Page.</i>
Inquiry into the mode of Creation ; whether by natural law, or through the immediate agency of God ; man not created by natural law ; the present laws are not creating laws ; organic structures produced by the immediate agency of Omnipotence	..... 177

## CHAPTER XIV.

Animals have not sprung from a single pair of each species ; theory of progressive creation of species inconsistent with the doctrines of the Scriptures ; centres or foci of creation refuted ; species not caused by modification by change of food or climate, but have a real existence in Nature	..... 188
---	-----------

## CHAPTER XV.

Theory of the transmutation of species, considered ; shown to be opposed to natural and existing laws, and therefore contrary to fact ; man, not sprung from the lower classes of animals, but an especial creation by Omnipotence	..... 205
--	-----------

## CHAPTER XVI.

Proofs that the days of the creative week were natural days ; no carnivora or other predaceous animals had existence on the land during the first epoch	..... 215
---	-----------

## CHAPTER XVII.

Era of man's creation considered ; non-discovery of human remains no proof that man did not exist upon the Earth ; arguments derived from former non-discovery of quadrumanous animals ; human remains not likely to be found among those of feral brutes ; proof that man was contemporaneous with all the organic beings whose remains are imbedded in the various strata of the Earth	..... 231
--	-----------

## CHAPTER XVIII.

*Page.*

State of the Earth at the close of the sixth day ; limited extent of land ; elevated temperature proved from the strata of the Earth ; the term Paradise or Garden of Eden applicable to the whole primeval Earth .....	.....	.....	.....	.....	243
---	-------	-------	-------	-------	-----

## CHAPTER XIX.

Erroneous views entertained by Penn and others regarding the period of the first general change or revolution ; the period assigned by the Mosaical geologists, for the formation of coal, proved to be erroneous .....	.....	.....	.....	.....	255
---	-------	-------	-------	-------	-----

## CHAPTER XX.

Phenomena apparent in the transition rocks ; conclusions to be drawn from them ; insular and tropical condition of the land and climate ; evidences of volcanic action, and gradual increase of land ; the deductions of geologists confirm the narrative of Scripture .....	.....	.....	.....	.....	266
--	-------	-------	-------	-------	-----

## CHAPTER XXI.

Fall of Man ; reduction of temperature ; submarine volcanic action ; mountain limestone a chemical product ; rapid accumulation of strata ; conglomerate rocks bear testimony to violent and speedy accumulation ; various agencies operating simultaneously to produce a rapid deposition of strata ; evidences of the agency of violent volcanic forces ; speedy accumulation of coal beds ; fresh creations necessary .....	.....	.....	.....	.....	276
--	-------	-------	-------	-------	-----

## CHAPTER XXII.

Periodical recurrence of volcanic violence ; new red sandstone to be considered the termination of the carboniferous era ; division of strata into systems wholly artificial ; the condition of organic fossils proves the lapse of time to be a fable ; fishes					
---	--	--	--	--	--

of the cupriferos slate speedily imbedded; speedy deposition of the lias, proved by the condition of the ichthyosaurus, plesiosaurus, fossil loligo and coprolites; speedy accumulation of the oolite proved by the condition of fishes and corals; animals of successive periods created in full maturity of structure .....	301
---	-----

## CHAPTER XXIII.

The Portland and other "dirt-beds" no indication of dry land; but of an estuary deposit; Furbeck and Wealden fresh-water formations interposed between the marine oolitic and cretaceous systems; indications of the violent action of fresh-waters; succeeded by submergence and diminution of land; subsidence of land; rise of cretaceous sea; and subsequent increase or re-appearance of land .....	325
--	-----

## CHAPTER XXIV.

The Second Curse; Mosaic Deluge; caused by the supernatural intervention of Divine Power; how produced; objections answered; prophecy of Enoch; rise of the Deluge; destruction of the organic World .....	337
--	-----

## CHAPTER XXV.

Effects of the forty days of rain; deposition of the Purbeck and Wealden beds; effects of the breaking up of the fountains of the great deep; volcanic action; subsidence of land; chalk of volcanic origin; rise and fall of the Deluge progressive; tranquillity of its occurrence refuted; subsidence of the waters and re-appearance of dry land .....	349
--	-----

## CHAPTER XXVI.

Supposed change of place between land and sea; alleged Scriptural proofs; proved erroneous; Penn's views; land existed in the northern hemisphere previous to the De-	
---	--

luge; supposed transport of animals from tropical to northern regions; proved to be impossible; Penn's erroneous views regarding the curse; not removed by the Deluge; the Deluge a second curse; the first Earth has not yet passed away .....	359
---	-----

## CHAPTER XXVII.

The fossil exuvie of the tertiary strata are the remains of animals which lived and died in the situations where they occur, subsequent to the Deluge; some fossils of the English lias and mountain limestone identical with those of the Himalaya; distribution of land in the early periods; proofs of high temperature; subsidence of equatorial lands; re-appearance of land in northern regions; deterioration of climate; deposition of tertiary strata; the northern lands inhabited by large mammalia; successive violent changes in the distribution of the rising lands; successive destruction of animals; the occurrence of the remains of elephants not necessarily indicative of high temperature .....	382
--	-----

## CHAPTER XXVIII.

New Creations after the Deluge, not contrary to Scripture; the present polar regions possessed a tropical climate during the secondary or antediluvian era; no aquatic animals were preserved in the Ark; fresh-water species of the present day are postdiluvian creations; no predaceous animals preserved in the Ark; the present predaceous tribes are postdiluvian creations; no animals now peculiar to cold climates existed in the antediluvian era; proof from Scripture; the animals preserved were probably the domestic races only; domestic stock of the modern era not to be traced from the wild races; many wild animals are restricted to particular countries and localities; their diffusion from a focus impossible; the olive tree a proof of new creations .....	398
--	-----

## CHAPTER XXIX.

	<i>Page.</i>
Theory of indefinite time opposed to Scripture ; arises from an erroneous interpretation ; evidence of rapid accumulation of strata ; proved in the transition series ; old red sandstone ; mountain limestone ; coal measures ; new red sandstone ; lias ; oolite ; chalk and tertiary deposits ; volcanic agency, more intense formerly ; indefinite duration of the Earth refuted .....	425

## CHAPTER XXX.

Geological arguments against the universality of the Deluge ; objections to a partial Deluge ; geological argument refuted ; Eden obliterated by the Deluge ; proofs from Scripture ; errors arising from the division of the two first verses of Genesis ; existing postdiluvian vegetation created in full maturity of structure ; inquiry into the true age of the world ; Septuagint version adopted ; the chronology of history and the chronology of the Earth proved to be identical .....	448
---	-----

## CHAPTER XXXI.

Conclusion .....	480
------------------	-----

## LIST OF PLATES.

## FRONTISPIECE.

PLATE I.—Figure 1 .....	121
PLATE II.—Figure 2 .....	127
PLATE III.—Figure 3 .....	128

XVII

### ERRATA.

Page	71	line	2	—after “ <i>Genesis</i> ” insert “ <i>and</i> ”
”	100	”	2	—after “ <i>expansion</i> ” dele “ , ”
”	129	”	3	—from bottom, after “ <i>ejected</i> ” read “ ; ”
”	139	”	7	—of heading—for “ <i>Boulder</i> ” read “ <i>Boulders</i> ”
”	141	”	6	—from bottom, for “ <i>then</i> ” read “ <i>than</i> ”
”	313	”	15	—for “ <i>Lyme Remis</i> ” read “ <i>Lyme Regis</i> ”
”	322	”	11	—from bottom, for “ <i>seem</i> ” read “ <i>seems</i> ”
”	389	”	6	—from bottom, for “ <i>were</i> ” read “ <i>are</i> ”





THE  
CHRONOLOGY OF CREATION

OR

GEOLOGY AND SCRIPTURE RECONCILED.

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CHAPTER I.

FIGURE OF THE EARTH; PRIMEVAL STATE OF FLUIDITY;  
HEAVY MATTER COLLECTED AT THE CENTRE; NEBULAR  
HYPOTHESIS REFUTED; AQUEOUS ORIGIN OF THE EARTH.

It has been ascertained from the facts disclosed by Astronomical research, that the Earth we inhabit is of an oblate spheroidal form; or such a figure as any fluid body would assume if possessed of rotatory motion in space. It has moreover been determined that our planet not only possesses a spheroidal form, but also, that it actually does revolve in space, from whence we are again at liberty, from inductive reasoning, to infer, that when the rotatory impulse was

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first imparted to the material atoms of which the planet is composed, those atoms were in a fluid or yielding condition. It has been farther ascertained, that if rotatory movement be imparted to fluid matter, the mechanical action thus engendered will have the effect of causing all the heavier particles to collect around the centre, where they will arrange themselves in obedience to the laws of gravitation and attraction, around the true centre of gravity, "at which all the weight of a mass might be collected without disturbing the equilibrium of any system of which the mass forms a part." \* .

Experiments upon the mean density of the Earth have proved that the centre, or internal portion, is composed of some dense and weighty substances, and thus we are again authorised, by direct experiments, to infer, that those central parts are composed of the heavy particles which the mechanical movement threw down towards the centre, when the materials of which the now solid matter consists, were in a fluid state, and that they were precipitated or collected according to the laws of gravity and attraction after rotatory impulse had been imparted to the yielding mass.

Now this fluid condition of the Earth's material elements, must have originated either from the operation of intense heat, or through the agency of

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\* Penny Cyclopædia—Centre of Gravity.

water; the one causing fusion; the other, a state of solution and suspension. If heat were the agent employed, as appears to be most generally believed, the material elements of the Earth must have been originally in a nebular state, and then, as the heat decreased by radiation into space, those materials must have gradually cooled down to a state of fluidity, from which again they would have passed, as the mass underwent refrigeration, to a semi-solid, and lastly to a solid state.

This theory was thought to derive great support, amounting almost to positive certainty, from the fact that there exist in space, many *apparently* nebulous bodies, which were asserted to exhibit various stages of the cooling or condensing process; but these asserted proofs have, of late years, been somewhat rudely shaken, if not altogether invalidated, by the unexpected results produced by Lord Rosse's gigantic telescope, by which many of the hitherto supposed nebulæ have been proved to be nothing more than clusters of stars, the true nature of which, from the great distance at which they occur, had not been ascertainable by the power of the instruments hitherto employed. It is true, that many still exist, which even this powerful instrument cannot resolve, but from the results already obtained, there naturally arises a disposition to believe that these, like the less remote bodies, are only waiting for an accession of space-penetrating

power in our telescopes, in order to be resolved likewise. On the 5th of March 1845, these supposed nebulae were observed by Lord Rosse, Dr. Robinson, and Sir J. South, the latter of whom in a letter addressed to "*The Times*" newspaper of the 1st of April, thus writes;—"most of them were, for the first time since their creation, *seen by us in groups or clusters of stars*; whilst some, at least to my eyes, showed no such resolution."—"The most popularly known nebulae observed this night, were the ring nebulae in the *Canes Venatici*, or the 51st of Messier's catalogue, *which was resolved into stars* with a magnifying power of 548; and the 94th of Messier, which is in the same constellation, and which *was resolved into a large globular cluster of stars*, not much unlike the well known cluster in Hercules, called also 13th Messier." "On subsequent nights, observations of other nebulae, amounting to some thirty or more, *removed most of them from the list of nebulae*, where they had long figured, *to that of clusters*; whilst some of these latter, but more especially 5th Messier, exhibited a sidereal picture in the telescope, such as man had never seen, and which for its magnificence, baffles all description."

The resolution of a part of these supposed nebulae into clusters of stars, appears "decidedly fatal to the conclusion that any such thing exists at all, as the condition of matter properly termed *nebulous*,

upon the hypothesis of which the theory before us is entirely based. If a succession of like effects is found to follow a succession of like operations, there is no argument more conclusive than that the repetition of the same operation, differing only in the scale of magnitude, would, if it were tried, exhibit a repetition of the same effects. If upon a succession of trials, with instruments of different capacity, a succession of so called nebulae are discovered, and upon each occasion the nebulous result of the previous trial be shown to be a delusion, by the more perfect scrutiny of that which succeeds, are we not justified in concluding, or rather, would we be justified in *not* concluding, that, had we an instrument as much exceeding in power the best now existing, by which the newest examples of the phenomena in question have been revealed, as *that* surpasses all that have gone before, we should discover that these also are but delusive appearances like the rest,—that, in fact, there is no such thing in nature as a *nebula* at all? And thus the whole theory of nebulous diffusion falls to the ground; for apart from this, there is not any thing that can reasonably be referred to as evincing a testimony of such a state of things having ever prevailed.”\*

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\* *Mason's Creation by the Immediate Agency of God, as opposed to Creation by Natural Law, p. 35.*

The probability of this nebulous condition has been well combatted by Professor Whewell, whose arguments all tend forcibly to show that no such state could ever have existed, for we are compelled, as he justly observes, to suppose that it in like manner was educed from a still prior state of things; and this again must have been the result of a condition prior still. "Nor is it possible for us to find in the tenets of the nebular hypothesis any resting place or satisfaction for the mind;" "the nebular hypothesis"—he continues,—“refers us for the Solar system, to a Sun surrounded with an Atmosphere of enormously elevated temperature, revolving and cooling. But as we ascend to a still earlier period, what state of things are we to suppose? a still higher temperature, a still more diffused atmosphere. Laplace conceives that in its pristine state, the Sun consisted in a diffused luminosity so as to resemble those nebulae among the fixed stars, which are seen by the aid of the telescope, and which exhibit a nucleus, more or less brilliant, surrounded by a cloudy brightness. This anterior state was itself preceded by other states in which the nebulous matter was more and more diffuse, the nucleus being less and less luminous.” “We arrive,” Laplace says, “in this manner at a nebulosity so diffuse, that its existence could scarcely be suspected.”\*

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\* Bridgewater Treatise—Astronomy, p. 185.

What then, we may ask, would be the consequence of this nebulosity if carried back, as Laplace supposes, to the extremest point of tenuity which it is possible to conceive, or for matter to arrive at? It has been urged that, "if all the matter existing in the Sun, planets and satellites, were expanded to, and even beyond the orbit of Uranus, the whole mass would still be but a speck in the Universe."\* This is no doubt perfectly true, but the argument cannot be restricted merely to the space which the Solar system might occupy, if reduced to a gaseous state, but must embrace, likewise, all those countless systems which lie scattered through the heavens, even beyond the reach of our most powerful instruments, for the cooling and condensing of our system into Sun and planets, is but one step only in the process of refrigeration; so that there must have been a time when every existing system, far or near, was in that gaseous state which the nebular hypothesis requires. What then, we repeat, would be the consequence of this nebulosity, if carried back to the extremest point of tenuity which matter could arrive at? Is it not evident that the intensity of heat necessary to produce this extreme state, must, at some former period, have pervaded all space? How then, did refrigeration commence?

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\* Dela Beche's Theoretical Geology, p. 26.



Refrigeration is known to be the result of a decrease of temperature, caused by radiation from a heated body into a cooler medium; but what became of the fluid heat of the nebulous matter, when all space was already occupied by the most intense heat that could possibly be produced? The supposition that such nebulous matter could ever have existed, is thus seen to involve a manifest and utter impossibility, for, if all space was occupied by matter in the extremest state of tenuity, there was evidently no unoccupied region into which the radiating heat could have found its way, and consequently an equilibrium having been established, *refrigeration could never have had a beginning!*

It has been surmised that the cooling of the fluid earth, would gradually have produced a crust of rocky matter around an internal heated mass, and that, as refrigeration still proceeded, cracks and fissures, and depressions in the external coating, must have ensued from contraction.\* Now this crust, from the circumstances under which it was produced, would, in all probability, have been analogous to *granite*, and the still highly heated, though gradually cooling internal mass, to the true volcanic rocks. The depression of any portion of the granitic crust, consequent on contraction,

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\* Ansted's Ancient World, *passim*.

would therefore seem capable only of giving rise to great irregularities of surface, totally unaccompanied by any of those remarkable phenomena which are now held to be indicative of violent disruption and elevation,—for the subsidence of any part must have been as slow and gradual as the refrigeration which gave rise to it, and consequently, there could have been no sudden ejection of fluid matter consequent on the pressure of the sinking granite. Such a theory is therefore in direct opposition to facts, for it is found that granite has itself been traversed by dykes and veins of other rocks in a state of fusion, and that it has been ELEVATED to its present towering position, not by the *depression* of other portions of its own mass, but by the struggles of the internal heated matter to force a passage to the surface.

But judging from analogy, it would seem to be a necessary condition, that if the mineral substance of the globe had been reduced from a state of fusion, it would have cooled down into a solid mass of crystalline rock, exhibiting no trace of stratification, as is well known to be the case with *granite*,—a rock which, *because it is* crystalline and amorphous, is considered to be of igneous origin. Yet, although granite is unstratified, we find that those other rocks which we term *primary*, are not all amorphous, but on the contrary, that they possess a true and well marked stratification.

Now the stratified arrangement of mineral matter, is supposed, when we contemplate the secondary and tertiary formations, to denote precipitation or deposition from tranquil waters, and we know, in fact, of no other agent that could produce this effect; consequently, we are bound in consistency and reason to refer the stratification apparent in some *primary* rocks, to the agency of water likewise. We may perhaps be told, that the amorphous granite, is the original crust cooled down from the nebular state, and that the stratified primary formations subsequently derived their origin from the waters which are supposed to have been held in a state of vapour, and that, as these became condensed into seas by the gradual refrigeration of the revolving mass, a precipitation of earthy matter took place, and thus produced the primary stratified rocks around the unstratified granite. Such a supposition, however, would not be at all more tenable than any other part of the theory, for it must be remembered that even had aqueous vapours existed during the nebular period, those vapours could not have held mineral matter either in suspension or solution, and, therefore, that if they became condensed into waters by the refrigeration of the globe, such waters would still have been pure, and would have contained nothing from which deposits could have been produced, because we know it to

be a law pertaining to evaporation, that while the vapour rises pure into the atmosphere, the mineral substances with which it was previously combined, are by this process disengaged from it. Consequently, the condensation of such vapours, or even the combination of the gases which enter into their composition, would have produced a sea of *pure fresh water*;—whence then were the saline properties of the ocean derived?

The stratification of primary rocks did not then originate in the deposition of mineral matter from condensed vapours.

But again it may be urged, that the constant abrading powers of the primeval ocean, caused the materials of the stratified primary rocks to be worn off the granitic crust that formed the outer portion of the cooling globe, and that, subsequently, the deposition of such matter gave origin to stratification. To this view it may be satisfactorily objected, that the only deposits which are now produced, are those which result from the action of the elements upon the *dry land*. The alluvial particles thus obtained are carried along by the rivers,—to be again deposited in the tranquil waters of the sea. We know, in fact, of no sedimentary or mechanical deposits that are taking place, except such as are formed from the abrading influence of the elements upon our coasts, for in the depths of ocean, where all is still, and no land

is thus exposed to waste, there is no evidence of the existence of deposits peculiar to such situations; and we judge from the appearance of the land upraised, that it has been formed in times past, by the very same process as that which is now going on before our eyes. Alluvial matter is produced by the agitation of waters, and the alternations of heat and cold; but does this variation, which is apparent on the surface, and which is induced by winds and other causes, extend to the depths of the ocean? Clearly not; such agitations are merely superficial; and while the elevated land is exposed to the destructive powers of the ocean's surface, of winds, rain, heat and cold, the depth or bottom of that ocean, remains for ever quiet and undisturbed by such causes. At the time, then, when the supposed granitic nucleus was submerged, there could have been no mechanical deposits, because the land had not as yet been raised above the surface of the waters; and, consequently, there could have been no rivers to carry down alluvium, nor action of the tides and elements upon the coasts. Even then if it could be conceded that the amorphous granite is the original mineral matter cooled down from nebular fusion,—it would still remain to be seen how the stratified rocks of the same system were formed around it, for it is quite evident that at the time when the granite cooled down and became surrounded by waters, there was

no vestige of *dry land* from which the materials of the stratified rocks could have been derived. The stratified primary rocks have, therefore, not been composed of fragments worn down from the pre-existing granites. Indeed the very fact that granite is acknowledged to be of plutonic, or igneous origin, and is found associated not only with primary, but also with secondary rocks, causing great disruption and disturbance of the strata wherever it occurs, seems to furnish sufficient proof that it did not result from the refrigeration of matter originally in a nebular state, but is rather due to causes which are perhaps in constant operation still, although only occasionally sufficiently excited to cause disturbance on the surface of the Earth; but be those causes what they may, it is abundantly evident, since granite is found to have disturbed at widely different periods, all the stratified formations superimposed upon it, that they have been violently active more than once since the time when, according to the theory of refrigeration, that rock was formed as the nucleus of the Earth; and, consequently, that it should be regarded as the result of the action of intense heat exerted upon some deep seated mineral substances, rather than of the refrigeration of the primeval elements of the Earth.

Such view would appear moreover to be confirmed by the fact that veins of granite, and even

of rocks seated beneath it, are sent up from unknown depths through the superior primary formations of *gneiss, mica-slate, &c.*, thereby seeming to prove that those formations were at least deposited *before the fusion of the granite took place*. It would likewise appear that the stratified primary rocks were not composed of granitic debris, however similar their constituents may be,—from there being an occasional and almost imperceptible passage from the one into the other rock, a fact which tends to show that the change was extremely slow and gradual,—or rather perhaps that the whole primary series, both stratified and amorphous, was first gradually accumulated and then subjected to the action of an intense central heat, which while it fused the lowest portion of the mass, and thereby destroyed all traces of its original form and appearance, merely tended to consolidate and crystallize the superior portion without altering its stratification. This would at once account both for the veins of volcanic and plutonic rocks, and for the occasional conversion of gneiss into granite.

If then the primary rocks could not have derived their stratified arrangement either from matter cooled down from a state of fusion, nor from the waters to which refrigeration is supposed to have given rise, it becomes again evident that the material elements of the Earth could not have proceeded from a nebular condition; and we must

consequently seek for other causes to explain the phenomena which they now present to our notice.

Now it would appear that the only condition under which they could have originated, if we reject the nebular hypothesis as inadequate, is that of precipitation and deposition from an aqueous body, which held the material atoms of the mineral globe both in solution and suspension; and it would then naturally and necessarily follow that when rotatory movement was imparted to the mineral solution, the heaviest particles would collect and arrange themselves into a mass at the centre, according to the known laws of gravity and attraction; and this mass would, moreover, be necessarily devoid of stratification, as being a deposit thrown down towards a central point from a circular body of waters revolving in space. But this very deposition of heavy and probably metallic substances would cause a change in the nature and property of the waters, and therefore each succeeding deposit would not only gradually and almost imperceptibly differ from the preceding ones in mineral composition, but they would all assume or give rise to that stratified arrangement which is apparent in the upper members of the primary series. "If we suppose the specific gravity of the centre about 12, and that the specific gravity increases nearly regularly from the surface to the centre, we would obtain a mean specific



gravity nearly equal to that of the Earth. If this supposition be well founded, the figure of the Earth is a spheroid of equilibrium. The ellipticity of such a spheroid would be intermediate between that of a homogeneous globe and that of a globe having an infinitely high specific gravity in the centre. Now, as this accords with facts, we are entitled to infer that the Earth approaches very nearly to a spheroid of equilibrium, if it does not, as is more probable, coincide with it entirely. Laplace was of opinion that the precession of the equinoxes, and the nutation of the Earth's axis, indicate a gradual increase of specific gravity from the surface to the centre. *This is the way that the materials would have arranged themselves, on the supposition of their having existed in a state of liquidity.* The heaviest would occupy the centre, and the rest would arrange themselves in the order of their specific gravity. Now *the only bodies known to us as possessing a specific gravity equal to 12, or that of the central nucleus, are certain metallic bodies.* Does this circumstance warrant the conjecture that the central parts of the Earth are composed of metallic bodies, and give probability to the opinion of Beecher that the veins of metallic ores found near the surface are minute offsets from these central proportions? ”\*

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\* Thomson's Outlines of Mineralogy and Geology, p. 2, Vol. I.

If then these effects are the natural consequence of rotatory movement imparted to an aqueous or liquid body,—and if such could not have proceeded from matter in a state of fusion, we are justified in preferring the possible and probable aqueous theory,—to the exclusion of the impossible theory of nebular fusion. But possibly some may object that we are equally far from a beginning here, as in the case of the nebular hypothesis, for the body of turbid waters must likewise have proceeded from some previous condition. The objection however, is scarcely valid, since in the foregoing theory we plainly perceive that refrigeration could never have commenced at all, while in the present one we merely start on our inquiry from that particular point of time, or beginning, when it had pleased Almighty Wisdom to *create* an aqueous body containing in solution and suspension the material elements out of which, by the operation of natural laws, the mineral globe was to be produced. What the previous condition of the mass may have been, or whether it had a previous condition, it is impossible perhaps to decide; we are inclined to think it had not, and that deposition and rotatory movement both had instantaneous origin at the precise moment when the aqueous body was created;—but, be this as it may, it will be quite sufficient for our purpose to know that it was brought about by the Will and Guidance of that Great First Cause, from

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whose *fiat* all matter must have originated. True, the primeval body of waters *may* have resulted from some previous condition; yet as it was quite as easy for the Creator to produce perfect water as to form it from a combination of its component gases, we may perhaps be allowed to believe that such was really the fact, more especially since the waters were to contain the material atoms of all mineral substances; and since we must feel assured that whether at once made perfect, or formed by the combination of oxygen and hydrogen gas, the mineral particles in either case must have been imparted to the deep by an act of the Creative Power. At all events we can perceive that it was quite possible for such a body to have been formed; while on the other hand we can equally perceive the utter impossibility of the nebular hypothesis without a direct violation of the laws of Nature. In allowing this, it will be immaterial for us to know what were the conditions of matter previous to the time when it had assumed the form of an aqueous spheroid, *provided* we can show that all the subsequent operations were such as are strictly in accordance with the laws which have been ascertained to exist and to regulate matter at the present day.

It may be said, however, that the sudden creation of an aqueous body such as we have supposed, argues the non-existence of the matter of our

planet previous to that particular point of time, and that we have given no proof either that matter was not already in existence or that it had not existed from eternity. It is not for us to assert that the matter of our globe was or was not in existence before this time; such may or may not have been the fact, and either way we hold it to be unimportant to our subject; but, regarding the eternity of matter, the case is different, and strong evidence may, we think, be produced to show that it must have had a beginning.

Matter either is, or is not, eternal; if it be not, then must it have originated from an act of the Creative Will, and the laws by which it is regulated, may have been operating through the course of ages to reduce it to the state of an aqueous spheroid, such as that for which we are contending. If on the other hand, it be eternal, then must it be co-existent with the Deity. Here, however, in the very outset, an insuperable barrier seems to rise up, in the fact, that if matter be eternal and co-existent with God,—then was not such matter created by Him, and consequently the very first and most important of His attributes is destroyed. Whence then the Universe with all its beautiful and wonderful furnishing of organic and inorganic forms? Shall we be told that they are the results of Chemical agency? And if so, whence came the laws which govern that agency? Or shall we be

told that God merely fashioned these out of pre-existing matter, and contrived wise laws for their control and guidance? But if He be not in very truth the Creator of matter, is it probable even, that He should have had the power to bind and regulate it by His laws? for such laws must necessarily imply a perfect knowledge of, and power over the matter itself which none but its Creator could possibly possess. All material things are subject to those laws which we usually term the laws of Nature, and being so subject, it is evident that matter is under the control of Him who framed the laws. Now there is this remarkable difference between the un-created, and that which is created,—a difference which ought at once to set at rest such futile cavilling,—namely, that the uncreated requires no regulating laws for its preservation; submits to no control;—but is in itself all powerful,—self-existing,—all sufficient, and eternal;—created things, on the other hand possess none of these qualities, but are subject to the control and guidance of regulating laws from which they cannot extricate themselves, even if they would, and the cessation of whose guidance would at once consign them to destruction. Take for example our own Solar system; here we find matter restrained and regulated by wise and beautiful laws which compel it to be what it is; but remove those laws, and what then becomes of the

system? Destruction and annihilation would be the inevitable results. Matter, therefore, *cannot exist except under the guardian care and control of the laws which govern all created things*; therefore matter is itself a created thing and cannot be eternal,—that is, *it could not have existed until after the laws of nature had been provided to regulate and preserve it*. Matter cannot exist without a preserving law; a law implies a law-giver; the law and the matter consequently demand a common creator! Whence then that law? The law of Nature is the Will of God; therefore He framed the law and then created the matter which it was to govern; consequently matter had a beginning, and is not eternal.

It has been objected to Werner's hypothesis of an universal solvent, by critics from whom a greater degree of liberality might have been expected, that no menstruum would be capable of dissolving all the mineral substances now known to us. The objection is far more specious than real, and appears to be altogether invalidated by the fact that the primeval waters were not an universal menstruum capable of dissolving the most "refractory substances" *at present known to us*,—but,—of holding in solution and suspension the matter or mineral atoms *from which these substances were eventually to be formed*. For it is to be remembered, that those "refractory substances and the pri-

mitive mountains themselves,—the metallic ores,—the hardest gems, and even adamant itself,”\* have been subject to heat, fusion, pressure and probably to the action of electric forces before they assumed their present forms and properties. It is not therefore, contended, for an ocean which would be capable of dissolving these substances, but only, of holding in solution and suspension, *the matter or materials* from which, by the aid of other agencies, they were *eventually to be produced*. To use a very homely simile, it may be urged that the loaf of bread upon our tables, was once a mere soft mass of flour and water, mixed and kneaded into dough, and afterwards baked into bread by the agency of heat;—but it is quite evident that if the bread be again mixed with water it will not return to its former state of dough,—nor of flour and water. The water, therefore, which once had the power of converting flour into dough, has not the power of reconverting the bread into flour, because other chemical action has been exerted upon it, which has entirely altered its original substance. Thus, too, the strata of the Earth, although once held in solution by waters, and formed into soft muddy deposits, have since been so altered by the action of heat and pressure, as to render it absurd to suppose that they could be reconverted to their

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\* Lyell's Principles of Geology.—*Passim*.

original elementary state, by any power short of that which created them. It would appear, then, from these observations, that there is nothing improbable in the idea that the mineral globe has been precipitated by natural causes, both chemical and mechanical, from waters possessing rotatory motion in space,—and it must consequently follow, that when the deposit was completed, the mineral mass would be composed of unconsolidated aqueous deposits, the centre one dense and unstratified,—the remainder possessing stratification around the central nucleus of the planet, while the whole were enshrouded or enveloped by the waters of that revolving ocean from which they had descended.

If we can admit the correctness of these views, we may at once satisfactorily account for the gradual and almost imperceptible passage of one rock into another, for it must be evident that such would necessarily have been the consequence, as the aqueous body underwent successive changes as the precipitation of matter proceeded; and as the abrupt transition from one rock to another is held to be indicative of the positive cessation of those causes which had produced the lower stratum, and the commencement of other causes to produce the superior one, so likewise the gradual transition or passage from one to another rock, shows that there was no break or cessation in the deposition of the primary series, but that such deposition was



constant and unceasing, varying merely in composition as certain matter prevailed or became gradually exhausted. In this state of total submersion, it is evident that the Earth could not have been furnished with vegetable and animal forms, nor could any organised beings, at all analogous to those with which we are now acquainted, either in a recent or fossil state, have existed, until after the formation of an atmosphere like that which now surrounds us.

The fossil exuvia of our transition and secondary strata, furnish us, moreover, with direct evidence that the beings to which they belonged, lived at a time when light was in existence, and from this fact we likewise gather that all the fossiliferous strata were deposited subsequent to the production of light upon this planet. It was necessary, therefore, before such forms could exist, not only that an *atmosphere* and *dry land* should be prepared, but that *light* should be created to dispel the darkness which had hitherto enshrouded the aqueous spheroid.

It may be necessary in this stage of the inquiry, and before entering upon any hypothesis as to the means by which these desiderata were brought about, to notice some objections which have been raised against the foregoing remarks. It will be seen from what we have already advanced that a sphere existed, consisting of water holding soluble

matter in solution and insoluble matter in suspension, and that this sphere revolved upon its axis, by which movement its insoluble matter was precipitated to its centre; that there was as yet no vital atmosphere, and no watery vapours, and neither light nor heat from the Sun.

The first objection which occurs to this doctrine, arises out of the difficulty of conceiving the existence of fluidity in the absence of heat—the Sun, according to the theory, not having yet been brought into its present relation with the Earth as a *luminary*. It must be obvious, however, on mature reflection, that a body containing in its bosom both in solution and suspension, the material elements of all the mineral substances with which we are acquainted, could not possibly have been devoid of heat. The chemical combinations going on within it, must, on the contrary, have evolved heat in very considerable quantities, and the temperature of the revolving fluid body would necessarily have been kept high. This heat was the natural effect of chemical action, and was altogether independent of the Sun, because that luminary was not yet itself sufficiently perfect to enable it to diffuse active heat. The chemical heat evolved in the chaotic ocean, was *the latent heat* which all bodies appear to contain, and which remains inactive and imperceptible until called forth into its active state by chemical combination with other substances.

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Thus for instance, a mass of carbonate of lime, offers no indication of contained heat, until a drop of acid is applied, when great effervescence immediately ensues, and considerable heat is evolved. This appears to take place independent of the Sun, and is a proof that the primeval ocean might have been in a fluid condition without the aid of that body, it being a chemical compound in which heat was evolved by vigorous chemical action going on within it. The heat thus produced would nevertheless have been quite insufficient to cause evaporation, and would have been confined to the waters in which it was evolved, imparting to them, perhaps, something of a thermal temperature and causing an increased or more rapid precipitation of mineral substances. If, therefore, it be allowed that chemical heat can have existence independent of the Sun, we shall find no difficulty in admitting the fluidity of the primeval aqueous spheroid, for that being a chemical compound in which vigorous chemical action was going on from the first moment of its existence, must necessarily have been kept at a high temperature by the heat evolved.

But we may in turn demand, from whence do the nebulists derive their heat, the Sun not being yet in existence?

According to their theory, the whole of the bodies which now occupy "the boundless realms of space," were originally in a state of extreme

tenuity or intensely heated vapour, and their present solid form is owing to refrigeration and condensation. Whence the heat that produced this tenuity?

Here too, a seeming contradiction, or at least, an inconsistency appears to be involved in the doctrine which teaches us that *these bodies* were at length produced from matter growing *cooler and cooler* until they attained their present degree of condensation and all their present properties, *when they began to give forth heat to their several systems!* The matter of the Sun,—now the centre of our system, gradually became cooler until it was refrigerated and condensed into a solid globe, whose atmosphere was capable of giving forth heat to the Earth and other members connected with it; but whence the heat which held the matter of all these bodies in a state of “nebulosity so diffuse that its existence could scarcely be suspected?” It did not proceed from the Sun, because that body was not then in existence, and was only produced by the decrease of heat! If, therefore, the fluidity of our aqueous spheroid could not have had existence before the Sun was created, so neither could the igneous fluidity of our planet have existed without the influence of the same body; and, again, as the Sun is said to be the result,—*not of heat* but *of refrigeration*,—it seems to amount to an absurdity to declare that

after refrigeration and condensation had taken place, it became capable of giving forth heat to a planet with which it had been associated from the beginning of creation in a like state of tenuity! For the Sun's present properties can only date from the time when refrigeration made it what it is.

The very reverse of such a process ought to be the truth, and we ought rather to declare that during the beginning the Sun had been growing warmer and warmer, until it had at last arrived at its maximum degree of heat on the first day, when it became capable of rendering its effects apparent and sensible upon the surface of our planet. But at any rate the above objection would be nullified by the fact, that, if the nebular theorists are authorised in *assuming* the existence of heat previous to the formation of the Sun, and therefore independent of it, so, in like manner, should we be justified in *assuming* the aqueous fluidity of our Earth, through the agency of a heat altogether independent of that body, more especially since we are enabled to assign a *natural*, and *therefore probable* cause for such heat, which the opposite theory is wholly unable to do.

A second objection arises from the supposition that a globe such as that conceived, would present a very small solid nucleus in a great sphere of water:—the present state being entirely

the reverse, namely, a great solid sphere with a little water scattered on its surface. What then became of the supposed superfluous water? We do not appear to possess any very accurate knowledge of the actual quantity of water existing upon the land,—some having estimated the sea at three miles,—others five miles, and some again at ten miles deep, on an average. We do not, however, perceive the necessity for supposing that there were any superfluous waters, since the theory does not require so vast a body, as the objection supposes, because the fluid sphere might have been of almost any consistency between a liquid and a semi-solid state, the chief thing necessary being a *yielding condition* in which the various insoluble matter might move freely, and become arranged according to the laws of gravity and mechanical movement; and this matter being at length collected by such movement and partially consolidated at the centre, the liquid from which it had been separated would continue to surround it with perhaps a comparatively trifling depth, and still retaining, as a part of its constituent materials, those substances of which the marine fluid is known to be composed. The stratified primary formations are, moreover, considered by some geologists to bear testimony to a chemical, rather than to a mechanical origin, a fact which tends materially to support these views, since it

would naturally have taken a longer time to precipitate into strata the finer matter held in solution by the waters, than the heavy insoluble matter deposited by the mechanical rotatory movement; thus the heavy substances which have been proved, by experiments on the mean density of the Earth,\* to compose the central portion of the planet, are in all probability those which are due to mechanical causes, while the primary formations are composed of those materials which the waters still continued to hold in solution after the heavier matter had collected itself into an unstratified nucleus. Nor does the present crystalline appearance of those rocks militate in the least against this supposition, since the crystals are no doubt due to the agency of intense heat exerted upon the original aqueous deposits at an after period.

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\* See Experiments on the mean density of the Earth, by Maskelyne, Cavendish and Baily.

## CHAPTER II.

THE FOREGOING DOCTRINES COMPARED WITH SCRIPTURE ; GRANVILLE PENN'S PROPOSED AMENDMENT OF GENESIS PROVED UNNECESSARY ; INVECTIVES AGAINST THE NEPTUNISTS UNCALLED FOR ; PROOF OF THE CHAOTIC CONDITION OF THE PRIMEVAL ELEMENTS OF THE EARTH ; NO MOUNTAINS DURING THE BEGINNING ; ERRONEOUS VIEWS OF DR. BUCKLAND ; THE EARTH NOT DERIVED FROM THE "WRECK AND RUIN" OF A FORMER WORLD ; FOSSILIFEROUS STRATA DEPOSITED SUBSEQUENT TO THE FIRST DAY OF SCRIPTURE ; OLD EDITIONS OF THE BIBLE NOT DIVIDED INTO VERSES ; GREAT DURATION OF THE PERIOD STYLED "THE BEGINNING," PROVED FROM ASTRONOMY.

IN the foregoing chapter we have endeavoured to show from inductive reasoning, that the mineral globe was at some distant period of time deposited in the centre of a body of revolving waters, which had originally held its material elements in a state of solution and suspension, and that when the primary deposits had been completed they were still enveloped by the waters of the ocean, and the whole sphere was enshrouded in darkness. It now therefore remains for us to ascertain in what manner the foregoing doctrines are supported by the testimony of Holy Writ, in order that we may be enabled to show how the ascertained facts of induc-



tive science agree with the narrative of the inspired historian.

The narrative of Creation, as presented to us in the Book of Genesis, opens with the distinct declaration that—

1. “*In the beginning God created the heaven and the earth ;*

2. “*And the earth was without form and void, and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters.*”—GENESIS I. 1 & 2.

Granville Penn and other writers have endeavoured to show that the translation of the second verse of Genesis from the Hebrew, might be considerably amended by being rendered, “*But the Earth was invisible and unfurnished, and darkness was upon the face of the deep ; Therefore God said, Let there be light.*”\*

Now it will be apparent that, if these critics are correct, the sense of the second verse of Genesis, forming, be it remembered, a portion of the *first paragraph*, will become blended with the third verse, belonging to the *second paragraph*, and will be made to have *prospective* reference to the asserted fact that the *invisibility* of the Earth was occasioned by the want of *light* ; and its being

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\* Penn's Comparative Estimate of the Mosaical and Mineral Geologies.

*unfurnished*, to the want of organized nature. If, however, the statement already hazarded of the circumstances under which the primary strata were formed, be deemed at all worthy of attention, we shall at once perceive that the second verse of Genesis stands in no need whatever of alteration or improvement, for, forming as it does, *in conjunction* with the first verse, a paragraph *altogether distinct* from the subsequent verses, it will be found to have reference *solely* to the *original state* of the earth or mineral matter, and that the words "*without form and void*," lead us at once to perceive that such must really have been the condition of the Earth, since its material elements were then held in suspension and solution by "*the waters*" of that revolving ocean, which the Bible distinguishes as "*the deep*."

"The Theistical Neptunists," says Dr. Ure, "would have us believe that our globe existed in a chaotic state, since the epoch indefinitely remote at which its materials were crudely congregated by Divine Agency; \* \* \* \* they merely show the presumption of man, who regards the primitive structure of this terraqueous globe, a labour too intricate for the instantaneous fiat of Omnipotence; again, had our Earth pre-existed from eternity, in chaotic confusion, as some cosmogonists have taught, in chaotic confusion it must have eternally remained. The regular order and subserviency of

its parts are irresistible proofs of an originating intelligence, which, acting with unlimited power, needed not to wait the slow progress of precipitation from a chaotic fluid, for the production of our, or any other planetary spheroid.\* Yet, notwithstanding this hasty invective against "the Theistical Neptunists," it would appear that the learned author has, unfortunately, either overlooked or sadly misunderstood the true meaning of the Scripture, for, so far from the idea of a chaos or confusion being adverse to its doctrines, the very first paragraph of Genesis actually declares that such was the primeval condition of the Earth, in the words, "and the Earth was *without form and void*; and darkness was upon the face of *the deep*." Here we are distinctly informed that "*a deep*" or vast ocean was in existence, and "the Earth was without form and void," *because* its material atoms were in "*chaotic confusion*," or without definite arrangement, in the bosom of the waters, which had been called into existence and immediately rendered subject to those natural laws which were imposed upon them, and which thenceforward operated to reduce the chaotic Earth to order. But this author, like many others, has erred from a mistaken notion that the Earth was at once created solid and perfected in all its

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\* Ure's New System of Geology, p. 9.

parts, and that mountains towered up upon its surface as now, although surrounded by the primeval ocean. Had such been the case, the historian world scarcely have ventured to affirm that it was "*without form,*" for it must be evident to every one capable of reflecting, that such a solid body must necessarily have been possessed of *some form*, however indeterminate that form might have been; and, in fact, according to these authors, it must have had the form it now possesses!

Neither does it appear by any means necessary to suppose because the chaos existed, that it was not within the immediate power of the Almighty to reduce it to order whenever it seemed proper to Him to do so; but it is easily conceivable that until His regulating laws had so reduced it, such matter must necessarily have been in a state of chaotic confusion. The chaos does not imply the existence of matter free from, and independent of, natural laws; because, without a regulating and preserving law, no material thing can have existence; but matter can, for a time, exist in a commingled or confused condition, subject to the laws which are arranging it into definite forms. That the Almighty and All-Wise Intelligence who planned Creation, could as easily have perfected His Work in one instant of time, had it so pleased Him, as by "the slow progress of precipitations from a chaotic fluid," we are most willing to

admit, nor do we know that the Neptunists deny it; but it may be asked, who is to assure us that such *actually was* the Almighty's pleasure? or that "the slow progress of precipitations," *was not* the mode resorted to? The word of God is the only record on those points that we possess, and that assuredly leads to the belief that the actual *forming* of the Earth was gradual, while the phenomena of the primary strata also confirm the supposition. The creation of the Earth's material atoms, may possibly have been instantaneous; but the arrangement of those materials into strata, was undoubtedly slow and progressive. The very same laws which operated in the earliest times, are operating still; and, as we perceive that strata are now accumulated by the slow progress of deposition, so we may reasonably infer, were they formerly accumulated. Why, we might ask, in the spirit of Dr. Ure's exclamation, are not our modern strata formed by "the instantaneous fiat of Omnipotence?" His originating Intelligence "needs not to wait the slow progress of precipitations;" why then does He wait? Simply because it has been His pleasure, for wise purposes to appoint certain laws to guide and control, under His general supervision, the operations of Nature; and, since we know that these laws are now acting by slow and progressive means, so we may rest assured they acted in the by-gone ages of

the world. The difficulty, if indeed there be any, appears to be comprised in the simple fact, that authors will invariably persist in interpreting the word "*Earth*," to mean the solid Earth as now constituted, instead of understanding the historian to speak of its materials or component atoms as a whole, as if already perfected. The term "*chaos*" so often objected to, refers simply to the condition of the materials out of which the Earth was eventually to be formed, and not to the condition of the Earth itself; for, until those materials had been precipitated and collected into a body, the Earth (commonly so called) had actually no existence; the objection therefore is absurd, and can only arise out of a misconception of the Record, and of the circumstances under which the now solid Earth originated. The *first paragraph* of Genesis would, moreover, appear to be merely an introductory or prefatory statement of what was about to be more fully described in the subsequent paragraphs; for it would appear from what is said in the tenth verse, that it was not until the period of the third day that God actually gave to the mineral mass the name of Earth. Previous to that time, as we find in the second verse, there was a vast body of waters on which the "Spirit of God,"—or Nature's law,—was acting;—but not until the third day are those waters denominated "*Seas*,"

or the matter which they had deposited, "*the Earth.*" "Whence,"—asks Dr. Ure, with reference to Werner's hypothesis of an universal solvent,—"arose that immense chaotic ocean within whose bosom the summits of the Himalaya and Andes were crystallized?" That ocean of course arose at the bidding of Him who planned Creation; and, we will venture to add, that its waters are still in existence in the selfsame quantities as in the beginning; and that they are confined, as we shall hereafter see, in those places which the Almighty Wisdom saw fit to assign to them, forming as they do, both the waters which are under the Earth, and the waters which are above the firmament. It may, however, be necessary to observe, that neither the Himalaya nor the Andes were in existence, as mountains, at the time when the aqueous spheroid was created, but that the particles of which they are *now* composed were then floating about in a mixed and "*chaotic confusion.*"

Thus the term "chaos," objected to by so many writers, as applied by the early Greek interpreters, is shown to be in every respect most applicable, as referring to the confusion of those particles, which were at first suspended in the primeval waters, and afterwards precipitated and gradually reduced to order by the operation of the regulating laws of Nature. The words "without form and void" are consequently found to be in perfect harmony

with the primeval state of the Earth's material elements.

While thus combating what we conceive to be the erroneous views of other writers, it may be necessary to guard the reader against the error of supposing that we uphold or adopt Werner's idea that all strata, whether primary, secondary or volcanic, are the precipitates of his universal solvent. All we contend for, is a body of waters revolving in space, and containing in solution and suspension the material elements from which after deposition, and the subsequent agency of intense central heat, we derive the volcanic and primary rocks, for, to the deposition of no others could it have been instrumental, and, we believe, that those waters ceased to precipitate and deposit from the moment when the true primary series was completed.

The doctrine maintained by Dr. Buckland is, that the first verse of Genesis merely refers to the fact, that at an indefinitely remote period of time God created the Heaven and the Earth,—which Earth was furnished with animal and vegetable forms, and rendered subject to a long succession of catastrophies and revolutions, by which the organic forms became successively destroyed and imbedded in the strata then forming. This state of things continued, he supposes, for many ages, until at length, at the termination of the undefined period,



the Earth was reduced to a state of "wreck and ruin." In this condition, the learned Professor believes it to have been on the evening or commencement of the first day of the creative week, and he suggests that the darkness which is stated by the text, to have encompassed the Earth, may have been a mere temporary darkness, caused perhaps by dense mists and vapours; and that this obscurity was now on the first day to be dispelled by the *re-admission* of light to the surface of the planet. In this view he is likewise followed by the Rev. Pye Smith, and many other writers.\*

That the *first*, and likewise the *second* verses point to a period indefinitely remote, when the material elements of our globe were called into existence, there can be no hesitation in admitting; but to say that the Earth was tenanted previous to the first recorded day of Scripture, is a doctrine wholly untenable and erroneous, as being altogether based upon assumption and devoid of the slightest proof.

According to this theory, a long succession of creations and extinctions of animal and vegetable forms took place, and we are taught to consider the fossil phenomena of our present strata, from the earliest secondaries to the tertiary beds inclusive,

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\* Buckland's *Bridgewater Treatise*, *passim*; "J. P. Smith on Scripture and Geology."

as the remains of the organized beings which lived and died during that indefinite period which the Scripture terms "the beginning." It is evident that the animals to which these fossil exuviae belonged, must have lived during a period *when light existed* upon the Earth, for they were furnished with eyes in all respects analogous to those of the present living races. But the Scripture informs us that light was not created, that is, with reference to our planet, until the first day, which is declared by geologists to be the termination of the undefined beginning, and the commencement of an entirely distinct period of time. It must consequently follow, that if light was only admitted to our planet after the undefined period had terminated, that animals furnished with eyes did not live upon the earth *during the beginning*, but were created, as the Bible assures us they were, after that light, for the reception of which their organs of vision were especially adapted. The authors, above alluded to, have indeed endeavoured to obviate this difficulty, by supposing that the second verse of Genesis refers to the condition of the Earth at the termination of the undefined beginning, and that the darkness which is therein said to have overspread the Earth, was merely *temporary*, or in other words, that the Heavenly bodies were in existence, although their effects were temporarily concealed by some dense vapours

which overshadowed the "wreck and ruin" of the former world; and that this darkness was to be dispelled by the re-admission of light on the first day of the new epoch.

Now, however convenient this reading of the text may be to support a preconceived theory, it may be objected, that, if the Sun and other Heavenly bodies were already in existence, and in their present relation to this planet,—that is, if they were then CAPABLE of *producing light*, the mists and vapours which are said to have existed, arising, it is to be supposed, from natural causes, might have had the effect of concealing *the actual sources of light*, but would have been wholly incapable of concealing *their effects*. This is, in other words, to say, that although the Sun might have been concealed from view by mists and vapours, it would have been impossible, without the intervention of a miracle, or the suspension of natural laws, for any such mists to exclude that active and visible light which is the effect of atmospheric action upon the solar ray,—which atmosphere, if the Heavenly bodies existed at all in their present state, must have existed likewise. The assumption, therefore, that light was to be *re-admitted* to our planet on the first day, instead of being then *created*, is altogether gratuitous and unnecessary, unless it can be likewise shown that the Heavenly bodies which had produced light upon

the Earth during the beginning, had been also destroyed when that Earth was reduced to a "wreck and ruin." For, it is evident that if these bodies still existed perfect, no vapours could have prevented their effects from producing visible and active daylight. "If," says Dr. Buckland, "we suppose all the Heavenly bodies and the Earth, to have been created at the indefinitely distant time, designated by the word 'beginning,' and that the darkness described on the evening of the first day was a temporary darkness produced by an accumulation of dense vapours 'upon the face of the deep;' an incipient dispersion of these vapours may have re-admitted light to the Earth, upon the first day, whilst the exciting cause of light was still obscured ; and the further purification of the atmosphere, upon the fourth day, may have caused the Sun and Moon and Stars to re-appear in the firmament of Heaven, to assume their new relations to the newly modified Earth, and to the human race."\* Now these views are evidently adopted for the purpose of making it appear probable that the fossil animals of the secondary and tertiary eras, lived and died previous to the first recorded day of Scripture, and to the creation of man. The fact of their possessing eyes, proves, as we have already observed, that they lived at a time

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\* Buckland's Bridgewater Treatise.

when light existed upon the planet, and therefore in referring them to the indefinite period called "the beginning," it was necessary to show that light had visited the Earth during that period, and that the darkness mentioned in the second verse was a mere temporary effect produced by "an accumulation of vapours," which obscured the Sun from view. Now this temporary obscuration of the Sun by vapours, is precisely that which other writers have adduced as a proof that *light* might have existed on the Earth from the first to the fourth day, without any necessity that the Sun itself should be visible further than by its active effects,—and this, too, is in a manner admitted by Dr. Buckland, from his stating that "a further purification of the atmosphere on the fourth day may have caused the Sun to *re-appear*." But this by no means meets the requirements of the case, for the obscuration of the Sun does not produce *darkness*,—which is *the absence* of light,—but, merely the diminution or decrease of its intensity,—an effect which is constantly witnessed on a very cloudy or foggy day. Therefore, in declaring that "*darkness* was upon the face of the deep," the Scripture positively asserts,—not that there was a temporary *decrease*, but an *absolute want*, of light. Dr. Buckland therefore leaves the question, where he found it ! Again, the very admission of the existence of vapours would be sufficient to

destroy the whole theory,—for *vapours* could not have existed without the atmosphere; nor could the atmosphere have been produced without the aid of aqueous vapours. The vapours then imply the existence of the atmosphere; the atmosphere implies the existence of evaporation; evaporation is an effect of the solar ray. The Sun and atmosphere were, therefore, both in existence, with all their present properties, and consequently there could not have been *darkness*;—for, while the vapours might have had the effect of screening the Sun from optical visibility, it would have been an utter impossibility for such vapours to have excluded *daylight*, or the active and visible effect of the atmosphere upon the solar rays; thus the utter darkness which prevailed could not have been caused by mists and vapours. If, on the other hand, such darkness prevailed,—and we dare not doubt the fact,—then is it equally certain that the Sun was not yet endowed with the power of sending forth its rays of heat; consequently light could not yet have visited the planet,—and thus the extinct races did not live and die during “the beginning,” previous to the first recorded day of Genesis.

Following in the wake of Dr. Buckland and other eminent geological writers, the author of the “Mosaic Creation” endeavours to show that the word “Earth,” as used in the second verse of Genesis, refers only to a portion of the globe which

was then in a state of confusion and darkness from some natural and temporary causes, and that it was to be restored to order by the operations detailed in the first verse of Genesis. "We understand the term 'Earth,' in this verse," he says, "to refer to *a portion* of the globe, and not to the whole. We are bound, with all explicitness, to state the grounds on which this opinion rests. First, when joined with Heaven, as in the phrase 'Heaven and Earth,' the reference is clearly to the whole Earth, as a part of the material universe; but no one would argue from this circumstance, that in every connection it must have this meaning. Secondly, when occurring alone, the idea attached to it by those to whom this record was given, and by its readers for many generations, was not that of the whole globe as we understand it."\* The error here,—for an error there assuredly is,—arises solely from the improper and unauthorised division of the two opening verses of Genesis. In the first verse we find that God created *Heaven* and *Earth*; here, according to our author, the whole universe is signified; but in the second verse he finds the *Earth* described as in a state of ruin and darkness;—and, as it there stands, according to his interpretation, alone and unconnected with the Heaven, he assumes that it

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\* Wight's 'Mosaic Creation,' p. 124 *et seq.*

refers to a *portion* of the globe. "We understand it," he says, "to refer to that portion of the Earth which the Creator destined for man's abode, when He should bring him into existence; and which was prepared for his reception in the manner described in this narrative." A little reflection and a reference to the very clear and convincing explanation furnished to Dr. Buckland in his Bridgewater Treatise, by Professor Pusey, would have satisfied him that the two verses in question form, in reality, but *one paragraph*, containing an abstract statement of the condition of that Earth, whose creation in the beginning had just been announced *in connection with* the Heaven. "In the beginning God created the Universe, *but the Earth* (or mineral globe) was *without form and void*," or according to the Chaldee, "*desert and waste*," or again according to the Greek, "*invisible and decomposed*." This last term is indeed in all respects most admirably illustrative of the Earth's actual condition at that one distant and particular period when it left its Maker's hands and became subject to His natural laws. It was "*decomposed*,"—not as is usually imagined from ruin or any catastrophe which had befallen it,—but because the mineral atoms which *now compose* a solid spheroid, were then *decomposed* or loosely congregated, without definite arrangement in the bosom of "*the deep*." But this division of the opening



verses causes still further errors to arise; the Earth,—that is, *a portion* of the Earth,—was, we are told, reduced to a state of chaos or ruin, and was submerged beneath the waters; yet there was an atmosphere surrounding all: “had there been no atmosphere, darkness, such as this was, would not have sat upon the face of the deep.”\* “Light existed on the first day; but such light as could not exist in the absence of the atmosphere;”\* “to speak of the light existing before the Sun was created is absurd, as the latter is the only source of the former.”\* How then are we to reconcile all this? *The Sun* is the source of *light*, which could not exist (rather, be *rendered active* or *visible*,) without the *atmosphere*, which atmosphere is seen to have *existed before the Sun!* This seems at once to destroy the whole theory, for the atmosphere now existing, and which, by scattering and reflecting the solar ray, produces that visible effect which we term daylight, *is itself absolutely dependent upon the presence of the Sun for its own existence!* The aqueous vapours which tended by combination with the dry air previously existing, to form our *vital air* or atmosphere, is the product or effect of the solar rays upon the surface of the aqueous spheroid by the mode of evaporation; consequently, if the atmosphere existed, as, according to this

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\* Wight's ‘Mosaic Creation,’ pp. 131, 161, 149.

author, it did, *previous to the first day*, so likewise must the Sun have existed, and therefore, however complete may have been the screen of clouds, mists or vapours which excluded that body itself from view, it would have been utterly impossible, as it is now, to prevent the effect of daylight, however dimmed;—and, consequently, no darkness such as that to which the Scripture alludes could have enveloped the chaotic Earth.

Again, another writer, whose chief aim throughout appears to be to establish the existing doctrines of Geology and the “Earth’s Antiquity” at the expense of the received interpretation of the Scripture record of Creation, informs us that the second verse of Genesis is not to be considered as having reference to “an un-reduced chaos, but to a disrupted, desolated, previously existing Earth.” Where then is the meaning of the declaration that the Earth was “*without form and void*,”—or “*invisible and decomposed?*” Are we to suppose that the *desolating earthquake* had destroyed *the figure of the earth?* Here again we learn that by “*the deep*,” we are to understand “a mass of dense aqueous vapours, incumbent on the overflowed Earth, and enveloping the surface in darkness;” and that it was these vapours which were on the second day divided by “*a vacuum*,” (which the atmosphere rushed in to fill,) from the ocean; “but that there is nothing in any of

the terms employed in these passages which necessarily indicate that this atmosphere was *at this time* first created or was not existing before.”\* Here then the writer splits upon the very same rock that has shattered the goodly vessels of his predecessors,—for the aqueous vapours floating over the surface of “the overflowed Earth,” demand both the existence of heat and atmosphere; for, without heat the aqueous vapours could not have been produced; whence then the heat? Was it from the Sun? We must necessarily suppose that it was, since both the atmosphere and the aqueous vapours which rise into it, are effects of the solar ray! How then, if the Sun and atmosphere existed could there have been darkness on the surface of “*the deep*”? Since the Sun is thus found to interfere with the alleged “temporary darkness,”—perhaps we may be told that it also had become a “wreck and ruin.” But then it would happen, that if the effect of the solar ray could be entirely suspended, a degree of cold would ensue, which, by the condensation of the atmosphere, would cause all the aqueous vapour now suspended in it to be precipitated to the Earth in rain or more probably in snow. The consequence of this would be the decomposition of the vital air through the loss of its moisture and oxygen, and

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\* “The Earth’s Antiquity,” by The Revd. J. Gray.

the necessary destruction of all organic beings; the atmosphere would then return to that state of dry air which must have existed before the creation of solar heat,—and which, being unfitted for respiration, would have been incapable of supporting life. How then could aqueous vapours arise, in the absence of the solar ray and atmosphere? and how could the “temporary darkness” occur through their interposition?—for if the atmosphere is the result of the action of solar heat upon the surface of the aqueous spheroid, it is evident that the alleged existence of mists and vapours must prove the existence of the perfect Sun; and if so, of light also. The temporary darkness thus becomes a fable.

But the Scripture in declaring to us that the Earth was created at a period very remote from the first day of Genesis, by no means leads us to the conclusion that “the Heavens” were then made perfect; but rather that the material elements of both Heaven and Earth were then created, and left under the control and guidance of certain imposed laws, to progress together through the indefinite period, towards that state or condition which they had severally assumed on the commencement of the first day. We are not taught to believe that these bodies were created perfect in the beginning “and that they were afterwards destroyed,” when, as Professor Buckland supposes, the

Earth was overthrown and ruined. On the contrary we are simply told that the materials of the Heavenly bodies and of the Earth, were created in the beginning, and when that undefined period had terminated, and it was deemed fitting to commence the operations which were to render the Earth ready for the reception of the organized classes,—then, and not till then, was heat made to fall upon the surface of this planet, in order to produce an atmosphere and other conditions, adapted to the constitution of that system which it was the design of the Almighty to create. Thus it will be at once evident to the candid and unbiassed inquirer, that as light could not have *been apparent* until after the undefined period of the beginning had terminated, the fossil exuviæ of our strata cannot possibly be the remains of animals which lived for ages upon the Earth, previous to the first day, for their structure proves them to have existed at a time when light also was in existence, and, therefore, that their creation and extinction are fixed both by the testimony of the Scriptures and by sound reasoning, to have been posterior to the first day of the Week of Miracles recorded in Genesis. Had light existed previous to that day, and by some means had become hidden from the Earth at the period in question, we should naturally look for some confirmation of that existence in the mandate which again called it

forth. The command would have been—"light re-appear,"—or "*be again apparent*,"—rather than "*light be*," or "*have origin!*" But since Astronomy teaches us that our system could never have been what it really is, unless each member had received a simultaneous origin; and since the loss of any one member would at once necessarily derange the whole, it must be perfectly apparent that the properties, which appertain to each, could not have been destroyed at the termination of the beginning, without involving in ruin the whole solar system.

Again with regard to our Earth having arisen out of the "wreck and ruins" of a former world, there is decidedly not the slightest foundation for such a belief to be gathered from any sentence in the Mosaic narrative, but, on the contrary, when we are told that "in the beginning God created the Heaven and the Earth,"—we are told so in reference solely to our own actual planet, and not to any world which may have preceded it. The materials from which our Earth was at length produced, were apparently called into being expressly for that purpose. We are not taught to believe that in the beginning, God created *a Heaven and an Earth*, from whose ruins our world was at length phoenix-like to spring forth; but that they were created with reference to the present system alone, for in the whole narrative of Creation

nothing appears to be brought forward but what has strict and sole reference to us, and to the Earth which we now inhabit. Neither is there any support to be found for such a theory from what takes place in nature; the laws which govern the system are preserving laws, and have governed it from the beginning; what then caused the "wreck and ruin" of the Earth? "The author of Nature,"—says Playfair,—“has not given laws to the Universe, which, like the institutions of men, carry, in themselves, the elements of their own destruction. He has not permitted in His works any symptoms of infancy or of old age, or any sign by which we may estimate either their future or their past duration. He may put an end, as He, no doubt, gave a beginning, to the present system, at some determinate period of time; but we may rest assured that this great catastrophe will not be brought about by the laws now existing, and that it is not indicated by any thing which we perceive.”\*

But so far from the strata of the Earth denoting that they are the wreck and ruin of a former system which has passed away, they actually give proofs of the most perfect order and design throughout; and, although there are disturbances and dislocations to be traced from the oldest to the most recent formations, such fractures are known to be nothing

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\* Playfair's Works, Vol. iv, p. 55.

more than the effects of those causes which contributed to upraise our strata above the waters, which strata had they not been thus disturbed, must for ever have remained submerged in patches of local sedimentary deposits; and their mineral treasures which now so materially conduce to the comforts and well being of civilized man, would all have remained buried in the depths of the Earth, for ever hidden and unknown. Those violent convulsions which caused the ruin of the former world, must, according to Dr. Buckland's views, have occurred subsequent to the completion even of the tertiary beds, for he tells us that these and the secondary rocks were all deposited prior to the existence of man, and to the commencement of the first definite day of Creation. Where then are the traces of those convulsions which were violent enough to overthrow a world that had hitherto subsisted through "millions of millions of years?" They cannot be referred to the disturbances above alluded to, for the common voice of geologists informs us that these were periodical and local, and occurred at intervals throughout those periods in which the deposition of the secondary and tertiary beds was taking place; and those periods we are told, had ceased before the ruin of the world was brought about. Will it then for a moment be credited that the traces of that violence which could ruin and subvert a system that had hitherto



endured for countless ages, should be nowhere visible among the ruins? Or will any one be willing to believe that traces of minor convulsions which are alleged to have occurred millions of millions of years ago, when our strata were in course of deposition, should still be fresh and glaringly apparent even to the most unobservant, while all trace of that *last and most terrible convulsion of the whole, has totally disappeared!*

We term that a wreck and ruin, which has had its materials or component parts displaced and overthrown from the order in which they formerly existed, and in which alone they were able to perform those functions and to answer those purposes for which they were originally designed;—thus, a fabric or a city is in ruins when the materials of which it was constructed, no longer hold together in their original order, but are subverted and confusedly mingled together in one common mass. But are the strata of our Earth thus overthrown or fractured?—or do they exhibit any signs of confusion and heterogeneous commingling? Or are they not, on the contrary, acknowledged by all competent observers, to present a certain order and succession of formations and strata, which is never in any instance reversed? There is no confusion in the order of succession or superposition to denote that the strata are the wreck and ruins of a former world, but all evinces regularity and

design from the oldest to the most recent rock; each stratum, system, and formation possessing a certain place in the series, which is precisely the same in all parts of the world, and which is never, even where the beds are most disturbed, by any chance departed from. The supposition, therefore, that we are living on an Earth which has been formed out of the shattered remnants of a former world, is a mere gratuitous assumption, altogether devoid of the slightest support either from revelation or from geological facts; and it further involves the extreme absurdity of teaching that all the fossil exuvia of our strata, from the transition to the tertiary beds, inclusive, are the remains of animals which lived and died, not on our present Earth, but in the imaginary former world; for the theory supposes that all these forms were destroyed previous to the creation of man, which event, by the nearly common opinion of modern geologists, took place after the deposition of the tertiary series.

The error has evidently been caused by the improper division of the two first verses of Genesis; Professor Buckland referring only the first verse to the fact of the Earth's creation at the beginning; by which division he is compelled to the conclusion that the second verse must describe the condition of the Earth at the *termination* of the undefined beginning, instead of *at the commencement* of

it;—whereas it is evident that these two verses cannot be so separated, but that they conjointly point out both that God created the Earth in the beginning, and that the original state of that Earth or of its materials, at that one remote and particular period, was a state of confusion or chaos,—that is to say, there was no definite arrangement of those materials. This likewise appears to have been the view taken of the subject by the Rabbi, David Kimchi.

“ Fagius, in his Annotations in *Critici Sacri on Genesis 1*, thus alludes to his opinions concerning the term ‘in the beginning.’ “ The Jewish Interpreters vary in their exposition of this term, but the opinion of Rabbi D. Kimchi seems preferable to me to any other ; for in his ‘Book of Roots’ he explains it in this manner. That God created the Heavens and the Earth, and *then* those things that were produced out of them. After which, Moses goes on to say that, *in the beginning of the creation the Earth was without form and void*. Thus far, he ; from which you see, that in the opinion of Kimchi, a certain order of created things, (which some are unwilling to admit) is here indicated by Moses ; viz., that God first created the Heavens and the Earth, and afterwards, those things which were formed out of them, as if from pre-existent matter ; *what the appearance and condition of the Earth was*, is intimated by Mōses in *the second verse*, where he says, ‘*the Earth was without form and void.*’ ”\*

“ Augustine, Lib. 1, *in Gen.* cont. Manich. c. vii.—

“ So that this Heaven and this Earth, first made, were no other than the world ; though not yet set in perfect order.”

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\* “ The Earth’s Antiquity,” p. 146, *et seq.*

“ Dr. Andrew Willet, *Hexapla in Gen.*—1632—

“ This Heaven and Earth, then, here mentioned to be created in the beginning, are the same Heaven and Earth which are now, comprehending the general matter and seed whereout all other things in Heaven and Earth were made : first created in the matter, afterwards perfected in form, and lastly beautified in the ornaments. This, then, was the order of the creation first, the same Heaven and Earth were created in a confused substance and unformed matter, then the form was added.”

“ Bishop Patrick. *Commentary*, 1727—

‘ God began His creation with the *Heavens*, as the most noble body, and then proceeded to the Earth, an account of which follows— ‘ *without form and void* ;’ that is, at first, He only created a rude matter of those things, which afterwards were fashioned as we now see them.”

These views are strengthened and corroborated by the fact that the division of the text into verses, is altogether a modern arrangement, and that in the older writings no such division exists; and they are still further supported by a very important observation of Professor Pusey, the Regius Professor of Hebrew in the University of Oxford, whereby he points out, “ that in some old editions of the English Bible, where there is no division into verses, we actually find a break at what is now the end of the second verse; and that in Luther’s Bible (Wittenburgh, 1557) we have in addition the figure 1, placed against the *third* verse, as being the beginning of the account of the creation of the first day.”\*

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\* Buckland’s Bridgewater Treatise, p. 25.

From this very clear and satisfactory explanation, which, however, Professor Buckland's Theory would not suffer him to acknowledge in its true sense, we arrive at the conclusion that the two first or opening verses of our modern editions, must be considered conjointly as bearing testimony to the primeval state of the Earth's materials; and therefore, that they actually form a paragraph distinct from the following verses, and referring exclusively to the pristine condition of our planet, and not to any other Earth which may have preceded it. The opinion that an Earth existed for ages before the present one, has indeed been adopted by several geologists as a means of reconciling the declarations of the second verse with geological phenomena, and herein we have a sufficient illustration of the adage that "one error generates many,"—for, by dividing the opening paragraph of Genesis, we derive from the announcement in the first verse, the fact of the Earth's creation at a remote period;—while the second verse, taken separately, leads to the conclusion that as the Earth is stated to have been in a state of disorder, such confusion must have arisen from some catastrophe which overwhelmed it with ruin; and Professor Buckland, taking this erroneous view, proceeds to show that this ruin occurred at the termination of the undefined beginning, and that the darkness which then overspread the globe, was merely tem-

porary, and was to be dispelled by the re-admission of light on the first day.

But if the ruin of the former world, either general or in part, was brought about by the operation of natural laws, and produced the mists and vapours which caused the temporary darkness,—wherein lay the necessity for the supernatural exertion of Divine power to re-admit the light thus temporarily obscured? We know that such power is never resorted to, in any case where the will of the Creator can be performed by His appointed laws, and that such laws were here in operation is proved by the admission that the darkness was only temporary. Since, then, His natural agents produced the mists and vapours, why not allow such agents again to disperse them and re-admit the light? for the interposition of supernatural agency to effect that which natural laws could perform, would be both unnecessary and redundant, and therefore opposed and repugnant to all we know of the mode by which the decrees of Omnipotence are fulfilled; and, consequently, we are bound in reason to reject such lame and impotent conclusions. On the other hand, the asserted interposition of the Creator, proves beyond a doubt that here was no remodelling of a system which had been temporarily overthrown,—no re-admission of light obscured,—but an originating or creating of a state of things which had not heretofore existed.

This reading of the text is evidently adopted through a wish to support the preconceived theory that the strata of the Earth are immeasurably old, and that their fossil contents are the remains of those animals which inhabited the land and waters during the undefined period indicated by the term "beginning." As, however, it is proved from the foregoing arguments, that the two opening verses are divided from the following ones, and form in themselves a distinct paragraph relating solely to the primeval condition of the Earth's material elements, at that particular period when the aqueous spheroid was created, and as the Scripture announces the production of light on the first day, when all are agreed the undefined period had terminated,—it seems to be incontrovertibly proved that the fossil exuvia of our strata are the remains of organized beings which subsisted on our present Earth subsequent to that first day,—a fact which is established by their possessing eyes analogous in all respects to those of the present living races; and consequently we further prove that those strata and formations which contain them, were deposited,—not during the long lapse of years styled "the beginning,"—but during some periods subsequent to the creation of light, and to the first day.

We have therefore in the first verse of Genesis, a mere simple declaration that the Heavenly bodies,

and likewise the Earth on which mankind has since continued to dwell, were both produced in the beginning of creation, by the Almighty. The second verse then proceeds to show us the state or condition of the Earth at the time of its material creation; namely that it was "*without form and void*, and darkness was upon the face of the deep." The Earth was "*without form*,"—or "*invisible and decomposed*,"—being a mere chaos or confused assemblage of mineral atoms, held in solution and suspension by the waters of that revolving sea or "deep," on whose surface the darkness sat. No mention is here made of the state of the Heavens, but from what is said in the sixth, seventh, and eighth verses, we are led to suppose that like the Earth they were as yet imperfect. That the Earth was so, we infer from the explanation given of its condition, namely, that it was "without form and void," and therefore *incomplete*. But we are further informed that "the Spirit of God moved upon the face of the waters;" from which expression we are not to understand literally that the Spirit of the Most High, sat or brooded moodily on the bosom of "the deep;" but, on the contrary, we must regard it as a figurative expression, and understand that His will then first gave origin to Nature's laws, by imparting to "the deep," the first impulse of rotatory movement, by which the fluid mass was



made to assume that spheroidal figure which it is now known to possess, and causing a chemical and mechanical action to commence within the bosom of that solvent, by which a precipitation of the mineral particles, which were floating about confusedly "without form" or arrangement, in a state of chaotic confusion, were gradually thrown down from all parts towards its centre, which then indeed formed the bottom.

The operation and effect of this law are thus truly and beautifully described by Milton:—

"Thou from the first  
Was't present, and with mighty wings outspread  
Dove-like sat'st brooding on the vast abyss,  
And mad'st it pregnant :"\*

That is, as a dove, by sitting or brooding upon her eggs, imparts to the inanimate mass, by some inscrutable process, the principles of heat and life, so, in like manner, did the Spirit of God, by brooding on the "vast abyss," impart to it the heat and principles of chemical and mechanical action, rendering it in His good time, pregnant with the mineral globe.

In endeavouring to prove the high antiquity of our Earth on evidence derived from astronomy, the Rev. Pye Smith observes, that "the light by which Sirius is seen by us, moving at its known

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\* *Paradise Lost*.—Book 1, line 19.

velocity of 192,000 miles in a second, is at least six years and four months on its passage to our system. By applying the equation which Sir William Herschel had established, he brought out that the brilliant nebulæ which only that telescope\* can reach, are distant from our system by a number of miles, to express which in common arithmetical numeration requires twenty figures, of which the first eight are 11,765,475, the 11 denoting trillions, and the other number billions; the remaining part of the sum being much more than 948 thousand millions. This almost unmanageable number is expressed by Sir William Herschel thus: "above 11 $\frac{1}{4}$  millions of millions of millions of miles!" It follows that the light by which those bright objects become visible to us, cannot have been less than one million and nine hundred thousand years in its progress."† Now it is fully in accordance with the statements of Holy Writ, to believe that the Heavenly bodies may have existed through ages, previous to the first day of Genesis, although they did not give light to our planet before that day. The text, it must be observed, insists upon nothing more than that light had not yet visited the Earth, but it does not declare that the bodies from which that light was eventually to proceed were not already in existence. The appli-

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\* Referring to a four feet reflector telescope.

† Pye Smith on Scripture and Geology.

cation, therefore, of evidence derived from astronomy proves indubitably the great antiquity of those material elements from which this system was at length elaborated; and it will be perfectly consonant to reason, and in accordance with Scripture, to believe that the creation of the material elements of the Earth, was contemporaneous with the creation of the elements of the Heavenly bodies, and that all were left under the guidance of certain natural laws to progress towards that state which would eventually fit them to form our present solar system, and for which they were evidently not prepared before the first day. Our planet, therefore, and the Heavenly bodies, existed together through the undefined beginning, although not precisely in their present relation to each other, until such time as each had become prepared to assume its proper functions in the system, when, having been perfected, their light would then first have reached or been intercepted by the aqueous spheroid. That period, as the Bible and reason lead us to believe, was the particular point of time spoken of as the first day, when light was, as regarded our Earth, to all intents and purposes created. But while the light of Sirius, is said to be six years and four months in reaching the Earth, and while the light of the brilliant nebulae is one million and nine hundred thousand years in reaching it, that of the Sun arrives in only eight

minutes. If, therefore, no light reached the Earth before the first day, when the effects of the Sun became apparent, it must necessarily follow that all light had arrived at the same state of perfection on the first day, and consequently that the light of the Heavenly bodies being simultaneously apparent on that day, must prove that if the elementary materials of the Heaven and the Earth were created at the same time, as the Bible and astronomy teach us to believe, the duration of the period styled "the beginning," must have been at least long enough to admit of the light of the nebulae reaching the Earth on the first day,—which will give to the strata, from the centre of the planet, up to the highest of the *primary* rocks inclusive, an age of no less than one million and nine hundred thousand years before the first day began; and as throughout that period no organized beings could have inhabited it, there was evidently a time, as the Scripture and Geology disclose, when neither vegetable nor animal life had existence upon the globe.

Taking a review therefore of the arguments already brought forward, the following would appear to be the conclusions we are warranted in arriving at. It would seem from the researches of many eminent Astronomers that our present solar system is so constituted and held together by certain laws of attraction and gravity, that were any

of its members to be destroyed, the remainder could not possibly subsist, in their present relation to each other. From this fact it will consequently result that all these members must have had simultaneous origin, or the system would never have been what it now is. If this be true, it will be easy to show what is the real meaning of the *first paragraph* of Genesis, and how perfectly the discoveries of science agree with that narrative. First then, it is stated that "in the beginning God created the Heaven and the Earth;" by which we are evidently to understand, that in the day when the Almighty was pleased to exert the creative power, He called forth those elements which were after a certain time to produce both our Earth and the Heavenly bodies which conjointly constitute the solar system. Those elements were at once made subject to the laws which have ever since governed inorganic matter; and, when the several members of the system were prepared by those laws to assume and to perform the offices to which they had been appointed,—that is, when the Earth was precipitated by the laws of chemical and mechanical action from the waters which are distinguished as "the deep," and had become a mass of stratified deposits which were in that particular state which rendered them fit for the purposes their Creator had in view, and when the Heavenly bodies had arrived at that state which rendered

them capable of giving light to our planet,—then, and not till then, were they all prepared to enter together upon the several offices which were to be assigned to them, and consequently at this particular period, “the beginning” ceased, and the first day of the new system opened with the creation or first appearance of light. The duration of this beginning was therefore, as the facts of astronomy clearly prove, no less than one million and nine hundred thousand years; thus satisfactorily showing the great antiquity of the materials of those strata which from the centre to the superficial primary rocks inclusive, constitute a mass of nearly 4,000 miles in thickness. These strata are totally devoid of fossil exuviæ, no organic forms having inhabited the globe during the beginning before light was created. In this opinion we are further supported by the valuable testimony of an eminent Bible critic, who declares that, “In the beginning God created the Universe; the Heavens and the Earth. But with respect to this earthly globe, it was not at once the abode of man and animals, as it is now; but there was a period during which it was utterly destitute of such a furniture of things as it now possesses; it did not enjoy the light of the Sun, and it was completely covered with water.”\*

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\* J. G. Rosenmülleri *Antiquissima Telluris Historia, a Mosé Gen. 1, descripta*. Ulm. 1776, pp. 6, 10, 11, 12, 71,—as quoted by the Rev. Pye Smith.

Secondly:—As light was not apparent to our Earth until the first day of the Mosaic narrative, we derive ample and very conclusive proof that none of those animals whose remains are imbedded in our fossiliferous strata, could have had existence before that period, because their being furnished with eyes establishes the fact that light already was in existence when they lived. From this circumstance, too, we are still further led to perceive that all the sedimentary deposits of our present Earth, from the lowest fossiliferous stratum, to the superficial deposits now in course of accumulation, must have originated through the agency of causes which have only begun to operate since the first day of Scripture; and, consequently, that to such strata no greater age can be assigned than that which the common chronology of history warrants. We are aware that in making this statement, we are exposing ourselves to the attacks of those who entertain the contrary opinion that the fossiliferous strata are the deposits of many thousand ages; but as such opinions are founded on the great thickness and imbedded fossils of each formation, and as we hope to be able as we proceed to bring evidence from the state of those fossils which will go far to prove that no great lapse of years was required for their deposition, we shall in the meantime rest satisfied with the chronology usually adopted by the interpreters of the Hebrew text.

The events already described, form the *first paragraph* of the first chapter of Genesis, are totally distinct from the events of the *second paragraph*, which comprises the history of the first of the six creative days, properly so called. This first paragraph therefore distinctly refers to what took place before the commencement of the first day, and is clearly defined by the author of the Book of Genesis, as "the beginning." What may have been the actual duration of that beginning beyond the time already pointed out, we know not, neither is it at all material, since we perceive that it was sufficient to admit of various stratified deposits of earthy matter to collect in the centre of "the deep," and we may therefore reasonably, and with every probability of correctness, infer, that when those aqueous precipitations were all completed, and a dense mass of stratified mineral matter had been collected in the depth or bottom of the waters, the Earth had then first arrived at that state which rendered it fit to play its part in the great work contemplated by the Almighty; and we are thus brought down to the termination of the first paragraph, or undefined period, termed "the beginning," and to the commencement of the second paragraph or first definite day of creation.

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## CHAPTER III.

CERTAIN CONDITIONS NECESSARY BEFORE ANIMAL LIFE COULD APPEAR; HEAT; EVAPORATION; ATMOSPHERE; DAYLIGHT; CREATION OF THE MATERIAL ELEMENTS OF THE VARIOUS MEMBERS OF THE SOLAR SYSTEM, CONTEMPORANEOUS; THE SUN, THE PRINCIPAL SOURCE OF HEAT; DAYLIGHT, AN EFFECT OF ATMOSPHERIC ACTION ON THE SOLAR RAY.

IN the preceding chapters we have endeavoured to show, both in accordance with geological facts and with the doctrines of Scripture, what were the operations of that beginning, spoken of in the first paragraph of Genesis; and we have seen that the mineral globe was during that period deposited in the bosom of "the deep," and that the aqueous spheroid was enshrouded in total darkness. It now remains for us to inquire what other conditions were still necessary previous to the production of dry land, and of the organized beings which were destined to inhabit it. Those conditions evidently were, that light and a suitable atmosphere should be produced, for without them we know that the vegetable and animal classes as now constituted, could never have had existence.

Now the atmosphere or vital air, by which we are surrounded, is known to be composed of aqueous vapour, and air combined in certain propor-

tions, and to produce aqueous vapour we know that heat is necessary; consequently without the agency of heat, no atmosphere such as that we move in, could have been perfected. We therefore satisfactorily arrive at the conclusion, since the present organic races could not exist in the absence of the atmosphere, that heat must have been produced, and that its operation upon the surface of the waters by which the mineral globe was surrounded, at once gave origin to evaporation, while again the aqueous vapour thus generated, by combining with the dry air or unmixed atmosphere which had hitherto existed shortly gave rise to that which now envelopes us. Nor was this all, for it likewise appears that the effect which we familiarly term daylight, is caused by the rays of solar heat being scattered and reflected through the agency of the atmosphere; consequently, as we perceive that this effect could not have been produced until after the atmosphere had been perfected, so we derive a positive proof that previous to the production of solar heat, the spheroid must of necessity have been surrounded by darkness. "The phenomena depending upon the decomposition, refraction, and reflection of light by *the vapour of the atmosphere*, are not less striking and important than those produced by electricity. To such effects upon light by the atmospheric vapour, we owe not only the cerulean tint of the sky, and all the splendid

colouring of the clouds, but the beneficial morning and evening twilight,—nay, even the light of day itself. ‘Were it not,’—says Sir J. Herschel, —‘for the reflecting and scattering power of the atmosphere, no objects would be visible to us out of direct sunshine, every shadow of a passing cloud would be pitchy darkness;\* the stars would be visible all day, and every apartment into which the Sun had not direct admission would be involved in nocturnal obscurity.’ Such are the beautiful phenomena, and the important results, of the action of the vapour of the atmosphere on light.”† Here then we have an atmosphere prepared for living beings to respire in, and likewise light to which their organs of vision were subsequently to be adapted, and without which light the organic world as now constituted could never have subsisted. “What,”—we may be asked,—“is there no light beyond the limits of our atmosphere? Is all in darkness there?” To such a question it may appear at first sight somewhat difficult to reply, unless indeed we answer it by another question, namely,—What is light?

Light and darkness, in our common parlance, appear to be wholly dependent upon the form of the eye in different living beings,—so that what is

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\* Without the modifying influence of the atmosphere, even Sunlight, to eyes like ours, would be darkness.

† Prout’s Bridgewater Treatise, Chemistry, p. 343.

light to one, is darkness to another. Nocturnal animals, for instance, pursue their way with ease and safety through the obscurity of night, when man would be unable to discern his own hand. This is an effect altogether dependent upon the construction of the eye, and proves that the darkest night to us, may be daylight to eyes capable of gathering the rays of light. Again it may be said that our power of vision is dependent upon the existence of the atmosphere, and that it is only through its medium that we can see at all; and this seems nearly proved by the fact that the organs of vision in animals are modified and adapted to their modes of life, the situations in which they are destined to reside, and the medium through which light is received. "The various coats, humours and lenses, contained in the eye, are all arranged for the express purpose of gathering the scattered rays of light which fall upon that organ as they do upon other transparent bodies. Flat-fish inhabit the lowest depths of the sea; and as this situation removes all danger to them from below, there is no necessity for visual organs upon the under surface of their bodies, the invariable position of which, moreover, would render an eye so placed almost entirely useless. Hence both eyes are situated upon the upper surface of their bodies, on which the light from above descends. The cornea or outer coat of the eye of these

animals, is also obviously formed to transmit light coming through a great depth of water. The various forms of the pupil, or opening in the iris by which light is admitted to the eye, is another provision whereby vision is facilitated, and accommodated to the habits of animals. In animals which climb, such as the *felinæ* and *simiæ*, the pupil, particularly in a bright light, is elliptical, the greater length being in the axis of the body. Animals whose habits render it necessary that they should have a considerable extent of lateral vision, such as whales and the cloven-footed and solid hoofed genera, have oblong and obliquely transverse pupils.”\*

“The form of the globe (of the eye) varies according to the medium in which the organ is to be exerted. In man and the *mammalia* it deviates very little from the spherical figure; in fishes it is flattened on its anterior part; in birds it is remarkably convex in front, the cornea being sometimes absolutely hemispherical. The convexity of the crystalline lens is in an inverse ratio to that of the cornea. Thus in fishes it is nearly spherical and projects through the iris, so as to leave little or no room for the aqueous humour. The *cetacea*, and those quadrupeds and birds which are much under

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\* Burnett on the Power, Wisdom and Goodness of God, as displayed in the Animal Creation.

the water, have this part of the same form. The aqueous humour being of the same density with the medium in which the animal lives, would have no power of refracting rays of light which come through that medium; its place is therefore supplied by an increased sphericity of the lens. In birds these circumstances are reversed; they generally inhabit a somewhat elevated region of the atmosphere, and the rays which pass through this thin medium are refracted by the aqueous humour, which exists in great abundance. Man and the mammalia, which live on the surface of the Earth, hold a middle place between these two extremes.”\*

Now the very fact that the eye of the bird which inhabits the more elevated region of the atmosphere, differs from that of man and animals which live on the surface of the Earth, seems at once to prove that such difference is required by the unequal density of atmosphere existing in the places severally occupied by birds and mammalia, and that the light which the organs of terrestrial beings receive, is modified and adapted to those organs by the atmosphere through which it passes; else why should the eye of the bird differ from that of man? It does not follow therefore that darkness must necessarily exist beyond our atmosphere;

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\* Lawrence's Note to Blumenbach's "Manual of Comparative Anatomy," as quoted by Burnett.

darkness *to our eyes*, no doubt there would be, but other eyes (though not terrestrial ones) might see there. Sunlight, to us, is the rays of solar heat reflected by the atmosphere; beyond the atmosphere therefore all would be darkness to us. But this does not seem to require us to believe that because we might not be able to see there, that darkness must necessarily exist to differently constructed eyes, if such there be. Light, *per se*, or as an independent principle, would thus appear to have no existence, but is dependent upon other causes, and derived from heat. The latent heat contained in rocks and minerals gives rise by chemical combination to active or visible light; but that light, like daylight, is only active and visible through the agency of the atmosphere; and, although in the absence of such atmosphere the latent heat might still exist, and be active under certain chemical conditions, yet no light could be rendered visible. While heat would thus appear to be an ingredient or chemical constituent, light, on the contrary, would seem to be a mere chemical effect. Whence then was derived that heat which tended so materially to perfect our present system?

The researches of astronomy teach us that the various members of which the system is composed are mutually dependent, and that without that attraction which each exercises upon the other "The solar system," as it is termed, could never

have become what it now is. If this be true, (and we have every reason to believe that it is so,) it will necessarily follow, as already stated, that the material elements of the whole must have had simultaneous origin, and that while the Earth was progressing by the method above related, towards that state which should render it a solid mineral mass, entombed within the bosom of the waters, the other members of the system were likewise, at the same time, progressing under the guidance of the Great First Cause, and through the operation of certain natural laws, towards that condition, or state of perfection, which was eventually to render them capable of diffusing heat. We are therefore justified in inferring that, at the particular point of time when the material atoms of the Earth had all been collected into strata in the centre of "the deep," the other members had likewise then arrived at that state which rendered them capable of diffusing heat, but for which they were not earlier prepared;—and from that period commenced all those *natural operations* which were absolutely necessary before the Earth could be rendered fit for the reception of those wonderful forms which have ever since continued to inhabit it.

Now the principal source of heat is the Sun, the centre of the system, and we are therefore led to believe that whenever the heat of this luminary *first reached* the surface of the aqueous spheroid,



*an evaporation* from the waters must have commenced, and *the vapours* thus produced, combining with the *dry air*, gave origin to that *atmosphere* which now surrounds us, and without which we could not exist.

But *the light* which reaches this planet, and which we term *daylight*, is caused by the scattering and reflecting of the solar rays by the *atmosphere*; we have therefore reached a point of time when day and night commenced, and previous to which, from the want of an atmosphere, the aqueous spheroid must have been enshrouded in impenetrable darkness. Thus it becomes evident that the effect of the solar rays upon the sea begirt mineral mass which composed our planet, was in the first place to give origin to *evaporation*, from which resulted an *atmosphere* that converted the solar ray into visible and active *daylight*. Here then we appear to have traced back the origin of those conditions which were absolutely necessary before organized existence could commence.

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## CHAPTER IV.

CREATION OF LIGHT ; OBJECTIONS ANSWERED ; CONTRADICTIONS OF AUTHORS ; VISIBILITY OF LATENT LIGHT DUE TO THE EXISTENCE OF THE ATMOSPHERE ; REASONS WHY THE SUN MAY NOT HAVE BEEN APPARENT ON THE FIRST DAY ; PROOFS THAT THE SUN WAS IN EXISTENCE ON THE FIRST DAY ; AGREEMENT OF THE FOREGOING DOCTRINES WITH THE HOLY SCRIPTURES.

THE narrative of Scripture informs us that the first day of terrestrial time was devoted to the creation of light, and consequently we are led to believe, that on this first period the darkness which had hitherto sat over and enshrouded the waste of waters, was now to be dispelled ; and accordingly, in obedience to the mandate "Let there be light,"—the Sun, Moon, Stars and Planets with all the Heavenly host were at once brought into their present relation with our spheroid as *luminaries*. That they had already existed from the time when the material elements of the Earth were called forth in the beginning, there is every reason to believe, but not until this first day, were they rendered capable of diffusing heat.

It has been objected by some writers that by the light which was called forth on the first day, we

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are not to understand *the Sun*; and we are told that "no truth in philosophy seems to be now more clearly ascertained than that light has a distinct existence, separate and independent of that luminary;" "that light seems, like heat, to have two states, active and latent. The active state causes its visible phenomena and our sensation of daylight. When this subsides *by the Sun's departure*, into its latent state, *our sense of darkness or night is produced*. The Sun's rays again emerging on it, have the power of changing its latent state into its active visibility."\* Now what is this but a very contradictory and unintentional admission, that *the Sun* is itself the only true source or cause of that light? For if the supposed latent principle is not rendered active "*until the solar ray emerges on it*" to produce our daylight, it is abundantly evident that it could never have been in its active state of visibility; that is, *there could have been no daylight until subsequent to the creation of the Sun*; and consequently, that if there was daylight on the first day, as all are agreed there was, so also must the Sun have been in existence on that day; for, without *the cause, the effect could not have been produced!* From such doctrines, therefore, it is proved that until the Sun was created, light must always have remained in its latent state; that is, *there*

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\* Sharon Turner's "Sacred History of the World," Vol. I, p. 94.

*was no visible light*, which accords precisely with the statement of the Scriptures. The result of such views is thus rendered extremely satisfactory, although quite unexpected by those who advocate them. But it is moreover evident that such a doctrine involves a decided and palpable contradiction, for we are told that the Sun *was not created* until the fourth day, and yet that there was light on the first day ; and that such light could not have been active ; that is, *could not have been daylight*, unless the Sun emerged upon it,—*for, when the solar ray is withdrawn* the light becomes *latent*, and *night, or darkness, is the consequence*. The light therefore which was visibly active on the first day, whence was it ? It must either have been active *without* the aid of the solar ray,—which the theory says it cannot be,—or the Sun must have been in existence, and rendered it active on that day, which the theory likewise denies ! Thus *it was*, and yet it *was not* ! Now if the latent light requires the agency of the solar ray to bring it into its active and visible state, how could it possibly have been active on the first day unless the Sun was then in existence and capable of diffusing heat ? It assuredly could not have been operated upon (which however the theory supposes was the case) by that which according to the same theory *was not created until three days late in the week* !

The same amiable and talented author proceeds to tell us in support of these views, that "when at night in a dark room, we strike a light and have a candle burning with its blaze till morning, we have a familiar instance of light without the Sun, and which is independent of it. A more curious example of light in which the Sun has no concern, appears in the fungus *rhizomorpha*. This genus, which vegetates *in dark mines far from the light of day*, is remarkable for its phosphorescent properties. In the coal mines near Dresden, it gives those places the air of an enchanted castle. The roofs, walls, and pillars are entirely covered with them, their beautiful light almost dazzling the eye. M. Marcel de Serres justly says, "Volcanos which emit torrents of light, teach us," 'que la lumière est entrée dans la composition du globe,' and not from the Sun."\* But this line of reasoning proves nothing more than that certain bodies have at present the property of emitting visible light under certain circumstances, and in situations where the light of the Sun is *apparently* absent; but it does not prove that such bodies would have been able still to produce visible light, even though the Sun had never been created, which to be at all conclusive, it must do. The question rather is, may not such bodies be *indirectly indebted to the Sun*, or to

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\* Sharon Turner's "Sacred History of the World," Vol. I, p. 96.

its effects on the surface of our globe, for the power to render their latent light visible? The theory really proves nothing until it shows us that the flint and the fungus could have emitted active or visible light previous to the creation of the Sun. But our author tells us that the light which has a separate existence from the Sun, remains latent or in *a state of darkness*, unless "the solar ray emerges on it;" and yet he most unaccountably brings forward, as an example of the existence of such light, the phenomenon produced by the fungus in a situation from which, he says, the Sun's rays are altogether excluded, namely, "*in dark mines far from the light of day!*" Here again is a contradiction, for if the Sun's rays are necessary to give activity to the latent light, how can the fungus produce visible light where the Sun's rays are excluded? It must either possess the property of giving forth light unaided by the solar ray, or the solar ray must reach it in the mine. But then again if our author be correct, and the fungus gives forth light unaided by the Sun, it will follow that there are *three kinds of light*; namely, one which proceeds directly from the Sun; a second which is only active when aided by the solar ray; and the third produced in situations "far from the light of day." The testimony deduced from "volcanos which emit torrents of light," is not more satisfactory or conclusive than that derived from

the phosphorescence of some plants, or the emission of a spark from flint, because it only assures us that "la lumière est entrée dans la composition du globe,"—without telling us what gives it the power of becoming visibly active. These views then, far from being conclusive or strengthening the idea that the light produced on the first day was independent of the Sun, rather tend to prove that that body was itself the cause of the light.

Again the same writer remarks that "many facts lead to the conclusion that light actually enters into the composition of all, or of most substances, and like heat, becomes a latent part of them. From these it is extricable with more or less rapidity without the interference of the solar ray, as in the burning of all inflammable bodies when it passes into its active and visible state. When the two liquids of nitric acid, and oil of turpentine burst into a flame on being mixed, without the approach of any fire, we see a striking instance of latent and combined light passing suddenly into a free and active state. So, when that brilliant blaze occurs on dipping the iron wire into oxygen gas, it seems to be the latent light combined in the gas, evolving from it instantaneously into its visible form. The Sun has nothing to do with these phenomena, nor with any of our artificial illuminations. All these may be deemed latent

light emerging from its combinations into free and active visibility."\* These examples, and indeed every one that might be brought forward, prove nothing more than that most, if not all substances contain a portion of latent light, which, under certain circumstances, may be rendered active and visible. But the question as to whence that latent light *derived the power of becoming visible* is nowhere attempted to be answered, nor does it appear to have entered into the calculation, that in every instance it requires some chemical assistance or combination to render it active; allowing, therefore, that every substance in nature contains latent light, we are still as far as ever from ascertaining what made that light *active* on the first day, so as to produce the effect of daylight. That light is now emitted by the immersion of an iron wire into oxygen gas, *apparently* independent of the Sun, is no proof whatever that the latent light is not indirectly indebted to the Sun for the power to become visible. We see now that such and such properties belong to certain substances, which, under particular circumstances, produce certain effects; but we cannot say that these effects would have been visible previous to the creation of that luminary, or that they would still exist if it were to be annihilated.

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\* Sharon Turner's "Sacred History of the World," Vol. I, p. 96.



But since we do know that all terrestrial things have undergone some changes since their original creation, it becomes more than probable that the occasional visibility of the latent light which enters into their composition is itself an effect of the solar ray; for, though latent light, as well as latent heat, may enter into the composition of certain substances, it is evident that such light can only be regarded as a chemical effect, and, like the latent heat, requires chemical combination to render it perceptible. It is very possible, however, that this latent principle may have existed even previous to the creation of the Sun as a luminary, while, at the same time, it is quite evident that it could not have become active, so as to produce daylight, until after the atmosphere had been perfected, which, as the atmosphere was the result of the Sun's action upon the surface of the aqueous spheroid, is in other words to say, that there could have been no visible light until after the Sun had obtained its present properties; that is, in fact, that the Sun itself was the *cause* of daylight. It has been the practice of most cosmogonists to declare that although the Sun was in existence with all its present properties on the first day, and was the cause of the light which was then called forth, yet that it was only apparent to the Earth by its effects, being itself screened from view, and obscured by the mists to

which evaporation had given rise.\* Now, although it is perfectly consonant to reason to imagine that such must really have been the case, yet as others have objected that the Sun must have been visible before the mists had gathered sufficiently to obscure it from view, it may be observed, that there does not appear to be the least necessity for adhering to such doctrine from any thing to be gathered from the Scripture, it being nowhere stated that the Sun was invisible. The opening verses inform us that "Darkness" was upon the face of "the deep;" but this was in "the beginning," previous to the creation of light. At the termination of that undefined period the first terrestrial day commenced by the production of light, which, from all we now know, must have been an effect of the solar ray upon the newly formed atmosphere, and the darkness was consequently thereby dispelled. But there is not the slightest allusion either in the third or subsequent verses to the invisibility of the Sun itself. The screening of that body from actual view seems to have been insisted on, not so much from a conviction of the existence of any actual necessity arising out of natural causes, as from a wish to explain the operations of the fourth day, and to show that the Sun might truly have been in existence on the

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\* *Vide Penn, Fairholme, &c.*

first day without having the power of becoming apparent further than through its effects, until the fourth day. All this, however, is perfectly natural, and the reason why *the effect* was visible, while *the cause* remained obscured, may be simply this ; the mineral substance of the Earth was enveloped by the waters, which had deposited it, and upon the bosom of those waters impenetrable darkness sat. But when on the first day that darkness was to be dispelled by the creation of light, the heat imparted by the solar rays, must necessarily have caused an evaporation to commence from the surface of the aqueous spheroid, from which dense clouds of vapour or fogs would have been formed and collected above its surface ; thus effectually obscuring the source from whence the heat emanated, although the effects were visible through the instrumentality of the newly formed atmosphere. In this there is nothing more wonderful than what constantly falls under our observation in a very dull and cloudy day ; the Sun is often obscured from our view by mists and vapours, as effectually as if it did not exist at all, and yet its rays pierce through the gloom and give us daylight. It is quite possible therefore for the Sun to have been in existence on the first day without any necessity for its being actually apparent further than by its effects of daylight. “ After the Sun and Moon are set, the influence of the atmosphere still continues

to send us a portion of their light ; not indeed by direct transmission but by reflection upon the vapours and minute solid particles which float in it, and perhaps the actual material atoms of the air itself."\* Here then is a familiar illustration of the fact, that the effect may be apparent, although the cause is concealed. It must be remembered also that although coeval in existence with the material elements of the Earth, the Sun could not have been rendered optically apparent until after the production of the atmosphere we live in. This atmosphere being mixed or composed of dry air and aqueous vapour, could not have been completed until heat, operating upon the surface of the waters, had given birth to evaporation. The atmosphere which had previously existed, was what is termed an unmixed atmosphere, and the natural consequence of evaporation taking place in such dry air, is thus described; "over the greater part of the Earth the air which during the day is warmed by contact with the Earth's surface, and thus becomes lighter, has a constant tendency to rise into the higher atmosphere. Now if this air were saturated with vapour, of course whenever the air by rising became mixed with the colder air, its vapour would be more or less condensed and a *cloud* would be formed. Hence if we lived in such an atmos-

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\* Herschel's Treatise on Astronomy, p. 33.

phere, we should be always enveloped in a mist, *through which the Sun would not be visible.*"\* Now since there could have been no vapour to combine with the dry air until the first day, when the solar ray by falling on the surface of "the deep" caused evaporation to commence, the effects in all probability would have been the same as those above described, and the Sun although created and rendered capable of diffusing heat, could not have been apparent through the dense mists which were collecting above the surface of the waters. But evaporation having once commenced and the dry air having in consequence become combined with vapour, would ever after have retained a portion, more or less according to the temperature, and thus constitute our present atmosphere. It is a known law that "under all temperatures evaporation decreases as the air which receives the vapour approaches its point of saturation. Hence it follows that in an atmosphere perfectly saturated with moisture, and in a state of thermal and dynamical equilibrium, there can be neither evaporation nor condensation;"† and hence, too, it follows that evaporation would be greater and more rapid in an atmosphere of air hitherto devoid of moisture. Such an unmixed atmosphere it was which existed at the time when heat was first called forth to

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\* Prout's Bridgewater Treatise, p. 297.      † *Ibid.* p. 299.

operate upon the surface of the planet, and consequently the effects of that heat must entirely have coincided with the facts above narrated.

The supposition that any visible light, capable of producing the effect of daylight, existed previous to the creation or rather to the perfecting of the Sun, is rendered altogether improbable by the fact that a period of light and a period of darkness constituted then, as they do now, "the evening and the morning," or one natural day. We know that this succession of day and night still continues and is caused by the diurnal rotatory movement of the Earth upon its axis, and that so long as "the solar rays are reflected and scattered by the atmosphere, we experience daylight;" but when those rays are withdrawn,—that is, when our portion of the Earth's surface turns round from the Sun, the period of darkness or night ensues. The very same alternation of day and night took place on the first day, and we are therefore justified in believing that the *same causes* produced the *same effects*. But since daylight is produced by the scattering and reflecting of the solar rays by the atmosphere, it is at once evident that there could have been no daylight until after the atmosphere was perfected; and, again, as vapour was necessary and was caused by the effect of the solar rays upon the surface of the aqueous spheroid, it seems to be satisfactorily proved that

the Sun itself was the source of the heat and light which reached our planet on the first day, independent of the fact that the latent light which is supposed to have existed at that period, could not have produced active and visible daylight without the assistance of the Sun.

“ The prior existence of water and air, as compared with that of plants and animals, is established by the fact that water and air *can* exist without plants and animals; but that plants and animals *cannot* exist without water and air. Hence, water and air must have existed with all their present properties before plants and animals were created;”\* and precisely the same argument holds good with regard to the Sun, for its prior existence, as compared with that of plants and animals, is proved by the fact that it could have existed for ever without plants and animals, but plants and animals could not have existed without the Sun. Hence it must have existed with all its present properties, before plants and animals were created. Now History informs us that the plants were created on the *third day*; the Sun therefore must have been created previous to that day, which at once sets at rest the question of its creation on the fourth day; it must then have been in existence on the first day and was, consequently, the source

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\* Prout's Bridgewater Treatise, p. 174.

of the light which was then called forth. And this proof becomes still stronger and more apparent when we reflect that "had the absolute quantity or the relative gravity of the atmosphere been materially different from what they are, the present order of things could not have existed."\* If then plants and animals could not have existed in any other atmosphere than that which actually surrounds the Earth, it is certain that such atmosphere must have been formed before organic beings were created; and from what has already been said regarding the composition and origin of this atmosphere, it becomes evident that the solar ray must have been in existence prior to the formation of the atmosphere. What then are the conclusions to be drawn from these facts? They are clearly that the Sun existed before the atmosphere; the atmosphere before plants and animals. History again informs us that plants and animals were respectively created on the *fifth* and *third* days; that the *second* day was occupied in giving origin to the firmament; and thus we are absolutely forced to the conclusion that the Sun was, with all the other Heavenly bodies, brought into its present state of perfection on the *first day*, and was the source of that light which the Scripture informs us was then for the first time called forth.

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\* Prout's Bridgewater Treatise, p. 174.



How exactly then do the actual phenomena of nature coincide with and confirm the doctrines of the inspired Historian, and how clearly does our present system evince in its ordering and arrangement, the design and impress of a Benevolent and Presiding Intelligence.

Thus we are satisfactorily assured that the Sun was created or perfected at that particular point of time when its effects produced what we term the first day; and immediately operated in causing an evaporation to arise from the surface of that ocean or "deep," by which the mineral globe was as yet surrounded, and the aqueous vapours thus produced combining with the dry air formed our present atmosphere. While these important operations were being brought about, the Sun itself most probably remained obscured by the dense mists which its rays had caused to rise from the waters, so that nothing but its effect of light was yet apparent, and as the Earth continued to revolve "God divided the light from the darkness. And God called the light, day, and the darkness He called night. And the evening and the morning were the *first day*."

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## CHAPTER V.

OPERATION OF THE SECOND DAY ; STATE OF THE EARTH AT THE END OF THE FIRST DAY ; FORMATION OF THE FIRMAMENT ; THE RESULT OF NATURAL LAWS ; CORRECTNESS OF THE SCRIPTURAL ACCOUNT ; MEANING OF THE WORD FIRMAMENT.

THE production of heat from the Heavenly bodies on the first day of our present system, naturally caused an abundant exhalation to arise from the surface of the waters which surrounded the Earth ; and these exhalations being condensed into a thick fog, as they came in contact with the colder superstratum of air, effectually concealed from view the Heavenly bodies themselves, while yet through the instrumentality of the newly-formed atmosphere, the effect of daylight was apparent.

This was the state of things at the termination of the first day, and, accordingly, on the morrow, or morning of the second day, when the Sun again appeared and shed his influence over the planet with its enveloping mists, the effect of that influence exerted upon the saturated atmosphere was to heat and expand it, and so cause the vapours to rise higher into space, still continuing, perhaps, to

obscure and screen from view the actual source of light, but leaving a clear vault around the spheroid ; thus separating the waters of the ocean, from those mists to which evaporation had given rise, and which now hung suspended above in a wide spread canopy of clouds. Here again, then, we perceive that the operations of this period were perfectly natural, and performed by the same laws that are now in force, for who has not, at some time or other, witnessed the early morning overcast and enshrouded in dense fogs, which, in a short time after the rising of the Sun, began first to waver, lift, and, finally, as the atmosphere became warmer or expanded below, float away upwards into the higher regions ? The work of this day was in fact the perfecting of that atmosphere which had been produced on the preceding day, but which, owing to the previous dry or unmixed condition of the surrounding air, imbibed so largely of the aqueous vapours rising beneath the influence of the solar ray, as to become saturated with moisture, and to form by contact with the colder superstrata of air, a dense unbroken volume of fog, hanging in a continuous shroud above the surface of the waters. When, therefore, the second morning broke, and the Sun once more poured his bright and cheering beams down on the misty scene below, the natural effect produced by his enlivening rays, was to raise the temperature of the saturated atmosphere and

by its expansion enable the fogs to rise from the surface of the deep, higher into space, where, gathering into clouds, they left the lower region around the planet cloudless and free. "The globe was thus disengaged from its incumbent vapour, but still *the effect* of light was alone apparent ; for congregated *clouds* had succeeded to terrestrial *mists*, and continued to render *the cause* of that effect *non-apparent*, and therefore, *optically*, non-existent ; as we ourselves experience during the prevalence of similar weather."\*

How then do these alleged facts correspond with the narrative of Scripture ?

The operation of the second creative period was, we are told, the formation of a "firmament in the midst of the waters, to divide the waters from the waters." "And God made the firmament and divided the waters which were under the firmament from the waters which were above the firmament ; and God called the firmament Heaven."

The most natural question which arises from a perusal of this statement is—"What were those waters which were now to be divided from the other waters which were under the firmament and enveloping the Earth at this period ?" The answer to this question we have already given in the

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\* Penn's Comparative Estimate of the Mosaical and Mineral Geologies, p. 174.

description of the operations detailed above, namely, the division, by expansion, of the atmosphere, of the cloudy or misty exhalations, from the superincumbent waters of the Earth ; an answer which shows clearly the correctness of the sequence of events as recorded by the inspired historian, for they are found to be strictly such as would inevitably have resulted from natural causes ; or, in other words, that they were all the natural consequences of calling forth heat and light on the previous day, and they could not possibly have followed in any other succession than that which is recorded.

“ The proper translation of the word, which our version, after the Septuagint, renders *firmament*, is, *the expansion*. And God said, *Let there be an expansion, and let it divide the waters, &c.* The cause of expansion is heat ; which naturally divides and separates that on which it acts, as we see in the case of evaporation and the ascent of steam ;” \*  
 “ The word *firmament*,” says another author, comes from a root that means to beat, to spread out by beating. By the ancients it was used to designate the blue vault above us, and corresponded with a free use of the term Heaven. The firmament, as now understood, designates that region that surrounds our globe, and in which float the clouds that shade us from the scorching beams of sum-

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\* Kirby's Bridgewater Treatise.

mer, or drop upon us the genial showers of spring. Firmament, we understand, to be equivalent to our term atmosphere. It therefore designates that body of air that surrounds the planet on which we dwell. "And God *made* the firmament." The idea generally attached to this clause is that of a proper creation. It is thought that at this time the atmosphere was brought into existence by the will of God; that previous to the second day there was no aerial substance surrounding the globe. It is well that the language does not demand this interpretation, for we fear it would have been found to oppose the principles of natural science, in such a manner as would render reconciliation hopeless. Light existed on the previous day; but such light as could not exist in the absence of the atmosphere. The Hebrew word rendered "*made*" does not primarily mean create; its prevailing signification is *to make, prepare, &c.*\* It is a different word from that rendered "*create*" in the first verse, and appears to be less powerful. Sometimes it is properly rendered create; but this is always regulated by the subject or the context. In the passage before us, we understand it in the sense of, *to prepare or arrange*. The Creator willed that there should be a firmament in the midst of the waters, to divide the waters which

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\* Gesenius' Lexicon.

were under the firmament from the waters which were above the firmament; and it was so—"In the midst of the waters;" rather, "between the waters." The waters which were under the firmament are generally understood to be the "waters" mentioned in the tenth verse, and which, when gathered together, were called "seas." What are we to understand by the waters separate from these, and said to be above the firmament? The general answer to this question, is, that reference is here made to the water which is known to lodge in the atmosphere. It ascends from the Earth under certain circumstances, and is stored up in the Heavens, till a wise and beneficent Providence dispenses it again to refresh and beautify the ground. It exists in the shape of clouds and vapour. Previous to the work of this day, (the atmosphere being saturated,) the watery vapours approached so near the surface of the Earth, that there appeared to be no line of demarcation; the one merged as it were into the other. Now the effect of the atmosphere (which was warmed and expanded,) immediately appeared in the separating between the waters below and the waters above. The surface of the former assumed a definiteness, the moist mists being rolled away, and the latter carried upwards to the higher regions. Thus God made, or prepared, the firmament, and divided the waters which were under it, from those which

were above it. "And God called the firmament Heaven;" the term Heaven is used in various senses in the Bible. In its highest sense, it refers to the habitation of God's throne; in its lowest sense, it is applied to the coating of air that surrounds the Earth, as in this clause. The phrase, "Let it divide, does not simply mean, let it separate; but also, let this separation continue. By means of the firmament, let there be a lasting separation between the seas beneath and the watery clouds above."\* Thus the operations of the second day are not to be attributed to any especial or supernatural exertion of Almighty power on that period, but to the fact of the Sun's having been made the source of heat and light on the preceding day; consequently, the firmament or expansion, was the direct and unavoidable result of those natural laws which the Almighty Architect had seen proper to impose upon matter in "the beginning," and which continued under His guidance to reduce chaos to order, and which, under the same guidance, rule matter at the present day. The succession of events related by the inspired historian is therefore established as natural and true.

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\* Wight's "Mosaic Creation," *passim*.



## CHAPTER VI.

PHENOMENA OF THE PRIMARY ROCKS CONSIDERED ; STRATIFICATION REFERRED TO THE AGENCY OF WATER ; AMORPHOUS ROCKS OF IGNEOUS ORIGIN ; AGENCY OF WATER AND HEAT PERCEPTIBLE ; THE AGENCY OF WATER PRECEDED THAT OF HEAT ; GRANITE OF IGNEOUS ORIGIN ; VOLCANIC AGENCY APPARENT ; CONCLUSIONS TO BE DRAWN FROM THE PRECEDING FACTS.

WE have arrived at the conclusion that the mineral globe was, during a long lapse of years, gradually collected in the centre of a vast revolving ocean, which still continued to surround it, until various conditions, necessary before vegetable and animal life could commence, had been fulfilled. These conditions were that heat, atmosphere, light and dry land should be prepared, adapted to the constitution of those organic classes which were destined to inhabit the Earth. We have endeavoured to show how the three first conditions were brought about, and it now only remains for us to inquire by what means the dry land was made to emerge from its enveloping shroud of waters. It may be necessary, however, before entering upon any hypothesis on this head, to bring forward such testimony as the phenomena of the Earth's strata

furnish, as to the means by which they have been formed, and then reasoning upon these facts, we may be able by the inductive process, to refer the visible effects to the proper causes or agents which have produced them.

In contemplating the vast masses of primary rocks which form a material portion of every mountainous country, there are two very remarkable facts observable, which cannot fail forcibly to arrest the attention of even the most superficial observer, while to the diligent inquirer into the causes which have been productive of the natural phenomena which the Earth's surface everywhere presents, they furnish a mine of deep and interesting research. These are the presence or the absence of stratification in rocks pertaining to the same system, and whose constituents, though often varied in their proportions, are still essentially the same; such, for instance, are *granites* and *gneiss*, with their varieties. These facts have long since attracted the attention of geologists, and have served, in a great measure, as foundations for the two great rival theories of Werner and of Hutton, whose disciples, from their opposite views, have been termed the Neptunists and Vulcanists. And first of stratification—In examining the rocks of the secondary series, it is a point universally admitted, that their stratification is to be attributed to the undoubted agency of water, the

materials or earthy particles of which they are composed, having, it is supposed, at one time been held in suspension and gradually precipitated from the bosom of tranquil waters, whether in lakes or estuaries; and we derive additional and satisfactory proof that such was their origin, from the facts which are observable in the aqueous deposits of the present day. We are led indeed to believe, from the existing laws of Nature, that stratification is the necessary and inevitable consequence of aqueous deposition or precipitation, and we can account for it in no other way. This seems to have been the means of inducing Werner to declare, that the materials of all rocks were once held in solution by waters possessing the properties of an universal solvent; and, if the views we have already hazarded regarding the origin of the Earth are at all correct, it would appear that his idea was not altogether devoid of truth.

On the other hand, the fact that some rocks of the primary series possess no stratification at all, together with the great compactness of their structure and the perfect crystallization which they exhibit, furnished Dr. Hutton with the chief arguments which induced him, in opposition to the Wernerites, to pronounce them to be rocks of igneous origin, whose structure proved them to have been subjected to great heat and pressure. Now it is an undoubted fact that the agency both of water and

heat is perceptible in the rocks of this series, and therefore that the observations and views of these two great men, however much they may at first sight appear to differ, are nevertheless both founded on truth; and, had the followers of either teacher been less strenuous in their opposition to each other, and more alive to the many truths and beauties of both systems, they might long ere this, by blending the main features of the two, have furnished us with something like a satisfactory solution of the problem. Admitting, therefore, with Werner, that the stratification which is apparent in most rocks of the primary class, is a proof that they were deposits from water; and, again, with Hutton, that the non-stratification of *granite* and sometimes too of *gneiss*, together with the compactness and perfect crystallization of all primary rocks, is a proof that they were once subject both to great heat and great pressure; it will necessarily follow that the stratification must have been completed previous to the exertion of that heat and pressure which tended to consolidate and upheave them. This is a fact which can scarcely admit of a doubt, for we must at once perceive that if the heat which tended to indurate and crystallize the original materials, had been first brought into action, as the nebular theory would require us to believe, no stratification would have been perceptible, because, when once those mate-

rials had undergone fusion and become chemically solidified by refrigeration, they would have presented an amorphous mass of crystalline rock devoid of all traces of stratification or aqueous agency. Thus we seem to derive a positive assurance that the first condition of the primary formations was that of a series of concentric aqueous deposits around a dense, though as yet unindurated, central mass or nucleus. Supposing, therefore, that the heat which subsequently tended to crystallize and convert them into compact rocks, originated in the centre of the mass, the natural effect would be to destroy all trace of stratification in those rocks which were in the closest contact with it, while those which were deposited higher in the series, would merely show the effects of the heat in their superior density, without at all losing the form or arrangement of their original deposition; and this is found to be the case, for *granite*, the lowest of the group, is known to be amorphous; while *gneiss*, the next in succession, and which indeed may be considered as a mere variety of granite, is sometimes found only partially stratified; while again *mica slate*, and other subordinate rocks, are found to possess a perfect stratification. It seems therefore necessary to admit that primary rocks have undergone an alteration since the period of their first deposition, and that such alteration has been mainly produced by the agency of

heat and pressure; and thus, although in the days of Dr. Hutton it was objected that the stratification and crystallization of *limestone* were opposed to his theory of internal heat, yet subsequent discoveries have proved that "in contact with igneous rocks the *chalk* of Ireland and the *limestone* of Teesdale are turned to crystallized carbonate of lime; and experiments in the laboratory have left no doubt of the propriety of referring this crystallization of the limestone to the mere agency of heat and pressure. The primary limestone is therefore crystallized, because it has been subject to high temperature, pervading of course all the rocks with which it is associated. But it occurs with nearly all members of the mica slate and gneiss systems. All those rocks then have suffered the influence of heat."\*

It appears also from the same author, that "experimental proof has been obtained that *quartz rock* is merely sandstone altered by heat, as had been inferred from phenomena at the contact of such rocks with basalt and greenstone, and that some of the characters by which gneiss and mica slate approach to granite, are owing to their having experienced considerable influence of heat; and many considerations render it probable that the circumstances under which they were accumulated

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\* Phillips' Treatise on Geology.

differed materially from those which produced the sediments of the secondary geological era.”\*

It seems certain, moreover, that the causes, whatever they may have been, which were instrumental to the elevation of the primary rocks, have been in operation more than once, for we find the granite, in many cases, bursting through and lifting up strata of all the subsequent formations ; thereby clearly proving that such disruptions must have taken place after the several systems so disturbed, had been deposited ; and, at the same time, it becomes more than probable that the induration of such systems was, in a great measure, caused by the effects of that internal heat or volcanic agency which conduced to their upheavement at a time when their strata were subjected to the pressure of the superincumbent ocean. Supposing this to be granted, it may yet be asked whether any traces of such volcanic action are perceptible among uplifted strata ? Now such may be said to constitute one of the best ascertained truths of geology, for it can be truly affirmed that no mountain range of any importance, is wholly destitute of such appearances, it being found that besides the veins of granite which pierce and traverse the stratified beds, there are others of an undoubted igneous origin, such as porphyry, basalt, greenstone, &c.

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\* Phillips' Treatise on Geology.

which not only burst through and overlie the secondary strata, but actually run up from unknown depths *from beneath the igneous granite likewise*. These are termed volcanic rocks, and are found to run up in veins and dykes through every series from the most ancient to the most recent of those which were deposited previous to the opening of what is termed the historical period. Often too they are seen to form a kind of pseudo-stratification with the aqueous deposits, between which they have introduced themselves in their passage to the surface, where again they sometimes overlie the true strata in masses exhibiting that step-like appearance which has obtained for them the Swedish name of *trap rocks*.\*

This disposition of the volcanic rocks would lead us to infer that the heat which has tended to indurate and crystallize the primary strata, has been engendered by some causes which are deep seated beneath the granites themselves; and, from the trap dykes piercing through these, it would seem to argue, that they have been the agents by which, in their struggles to find egress at the surface, all the other rocks have been upheaved. Certain it is that the seat of volcanic fires is deeply situated beneath even the primary rocks, and we find Dr. Buckland observing, "that trachyte and

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\* Trappa, signifying *stair-like*.



lava being ejected through apertures in granite, prove that the source of volcanic fires is wholly unconnected with the pseudo-volcanic results, of the combustion of coal, bitumen or sulphur in stratified formations, and is seated deep beneath the primary rocks.”\*

“The idea now entertained by many observers that the seat of volcanic action is not very far removed from the surface, is readily refuted by many well authenticated facts, which prove at least that such action is beneath all the series of formations with which geologists are yet acquainted, and they therefore warrant the belief, that they are deep seated within the Earth, and not by any means superficial. At the Puy Chopine in Auvergne, granite is found intermingled with the trachyte and greenstone, thrown together in confusion as if the whole had been elevated at one time, before the rock had been entirely changed by the process. In the lavas of the Vivarais, in those of the Rhine, and in other localities, imbedded masses have been met with having much the appearance of an altered gneiss or granite. Humboldt mentions his having found in the midst of the new volcano of Torullo in Mexico, white angular fragments of syenite, composed of a small portion of hornblende with much lamellar felspar.

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\* *Bridgewater Treatise—Geology.*

Gemellaro discovered a mass of granite containing tin-stone among the ejected masses of Mount Etna, and the same rock has been discovered amongst the trachyte of the Ponza Islands by Mr. Scrope, and in the lava of Vesuvius by Dr. Thomson of Naples. Mica slate has, in one instance, been found ejected by Vesuvius, and various granular limestones of a dolomitic character are found amongst the masses ejected from the old crater of Vesuvius, which lie accumulated in the Fosso Grande, and the hollow-ways on the slope of the volcano. If then there be reason to conclude that the substance which has supplied the materials ejected by burning mountains or constituting their internal nucleus, be divided from granitic rocks, a strong argument will be afforded in favor of the great depth at which the operations are seated that have given rise to the effects we witness. This inference indeed is greatly strengthened by a consideration of the phenomena attendant on an eruption, the general tenour of which plainly denotes, that the focus of the action is situated at a depth at the least as great as that to which granite may be supposed to extend.”\*

The effect of volcanic action is, as might be expected, extremely variable, changing according to the nature of the rocks, through which it passes;

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\* Phillips' Article—Geology—Encyclopædia Metropolitana.

thus chalk is converted into crystalline carbonate of lime; some secondary limestones are rendered fine grained like the primary Carrara marble; and at other times a large dose of magnesia is imparted, so as to render the limestone dolomitic. Sandstones are changed in the neighbourhood of such volcanic veins, into quartz rock, and in general wherever such disturbing forces are perceptible, the rocks of the secondary class, immediately in contact with the trap, have been more or less altered and often indeed converted into substances resembling the primary rocks in structure and in ingredients."\* Felspar is one of the most abundant minerals in these rocks, and forms an essential portion of most porphyries, a rock peculiar to the trap formation. Hornblende, too, is found to enter largely into the composition of some members of this family. Now, as both these minerals are found to enter likewise into the composition of primary rocks, but especially into granites and gneiss, which, from being the lowest in the series, are more immediately in contact with the volcanic substances, it becomes perhaps probable that these latter have tended, in no inconsiderable degree, to modify the Plutonic rocks, by the greater or less admixture of mineral substances more properly belonging to themselves; thus the felspar and hornblende may have been

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\* Phillips' Treatise on Geology.

imparted to the granites when the latter were in a state of fusion from contact with the volcanic rocks, in like manner as large doses of magnesia have been administered to the limestones through which the trappean currents passed. Or, indeed, more probably still, the granite may itself be a member of the volcanic group, especially since the line of demarcation is sometimes undistinguishable, and since even secondary rocks, when acted upon by volcanic rocks, are converted into substances resembling the primary rocks. The hornblende strata, which are often associated with the primary series, ought more properly to be considered as a volcanic rock *locally interstratified*, rather than as belonging to that class, the same as greenstone is often found locally interstratified with the secondary formations, without being, on that account, classed with them as a member of their series.

It would then appear, from the testimony of all observers, that the strata of the Earth give incontestible proof of the agency of deep-seated and violent volcanic action, by which the superior deposits have been rent and upheaved as the central incandescent matter sought egress at the surface. These proofs consist in the existence of certain volcanic products which are found to have proceeded from unknown depths in the interior of the Earth, from beneath all the formations with

which we are acquainted ; and the tilted disposition of the superior strata shows that they have been elevated from their original horizontal position, by some powerful forces acting from beneath them, by which they were first disrupted and subsequently elevated, as the expansive force of the internal molten matter sought a passage upwards. We gather, therefore, from the facts above detailed :

First,—that the primary rocks are of two kinds, namely, the stratified and the unstratified.

Secondly,—that the stratification of the one portion argues a deposition from some primeval waters ; while the high state of induration, together with the amorphous condition of the other, betokens the agency of great heat and pressure exerted upon its soft materials, after deposition and stratification had taken place.

Thirdly,—that both divisions being invariably destitute of organic remains, proves them to have been formed under circumstances and at a time which precluded the possibility of any such forms inhabiting the planet. They were therefore formed before the creation of either animals or vegetables.

Fourthly,—“ that they were deposited under circumstances which differed materially from those of the secondary era.”\*

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\* Phillips' Treatise on Geology.

And lastly,—that they are found to be traversed by veins of volcanic substances from beneath them ; from which we infer that the heat which gave origin to these veins and dykes, was deep seated, and caused, in its violent struggles to find vent, the upheavement and dislocation of the strata above it.

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## CHAPTER VII.

CONJECTURES AS TO THE MEANS BY WHICH DRY LAND WAS PRODUCED ; SUPPOSED DENSITY OF THE INTERNAL PORTION OF THE EARTH ; SUPPOSED FUSION OF THE CENTRAL PORTION ; PRIMEVAL WATERS DRAINED INTO DEPRESSIONS ON THE SURFACE ; ELEVATION OF LAND SIMULTANEOUS WITH DEPRESSION AT THE ANTIPODES.

THUS far we have traced out certain effects which are observable in the strata of the Earth ; let us now endeavour to ascertain how that Earth became raised into dryland from out of its enveloping waters.

Various have been the conjectures as to the means by which the dry land was made to emerge into the light of day, and each has in turn given way to others as little satisfactory as their predecessors. These various theories have arisen out of the different views entertained regarding the condition of the internal or central parts of the Earth ; some declaring the centre to be composed of heavy and solid substances ; others that the interior is kept in a state of fusion by the enormous external pressure which it has to sustain ; while there are not wanting those who maintain that the Earth is hollow and forms the abyss into which the primeval waters were drained off. It may therefore be

as well in the outset to inquire into the claims which these theories have on our attention.

It has been inferred by the advocates of the first theory, from calculations deduced from observations on the attraction of mountains, that the central parts of the Earth are composed of some heavy and solid matter; and Phillips informs us that this "superior density of the internal parts of the globe is occasioned by the accumulated pressure which they have to sustain."\*

There are many, however, who contend that the external pressure, so far from causing the internal solidity of the Earth, actually induces fusion and keeps the central parts in a state of molten liquification, which has, in times gone by, through its expansive power, thrown up the mountains of the Earth. But if the many mountain tracts which vary the surface, have been thrust upwards from the bowels of the Earth by the action of permanent central fires, might it not reasonably be expected that some clue, some traces at least of phenomena should present themselves, from which we might infer the existence of subterranean caverns corresponding in extent to the bulk thrown out? Yet nowhere among the many deep shafts and mines which have been sunk in various quarters of the world, have any such indications been detect-

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\* Phillips' Treatise on Geology.



ed, but on the contrary, all tends to corroborate and confirm what direct experiment has proved, namely, that no such cavities exist, but that the interior of the planet is solid to its very core. Yet, notwithstanding this, it is equally certain from the phenomena of the strata, that central heat has formerly existed to a great extent, and we shall hereafter see that this internal heat has, in great measure, been conducive to the solidification of the central parts of the planet.

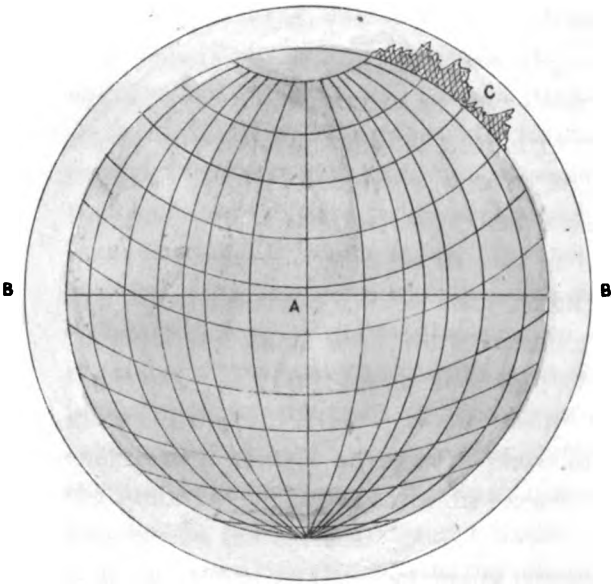
We shall not therefore be willing to conclude with some wild theorists that the Earth is hollow, and forms within itself the vast abyss into which the superabundant waters of that ocean which formerly covered the surface, were drawn down and confined. This untenable notion has arisen altogether out of the mistaken idea entertained by many writers, that the Earth was at once formed in "the beginning" with lofty mountains as at present, and that these were submerged beneath the ocean; the vast depth therefore of these imaginary waters, rendered it necessary to have recourse to a central abyss as a place of refuge for the quantity supposed to be in excess of that now existing on the surface.

With regard to the doctrine of central fusion, it would seem that if the heat engendered within, produced by its expansive powers and struggles nothing more than an upheavement on the surface,

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PLATE. I.

FIG. I.



a hollow or hiatus must sooner or later be necessarily produced within, so soon as the heat decreased, equal to the volume of the mass ejected from the centre, but no dry land would be produced.

Let A (Fig. 1) represent the stratified mineral globe, surrounded by B B the primeval ocean; then, if an upheavement from the centre took place at C, by the outburst of a supposed incandescent or volcanic mass at A, it seems evident that instead of *decreasing* the depth of water and producing *dry land*, the depth must, on the contrary, be actually *increased* to an extent corresponding to the quantity of water displaced by the matter protruded at the point C. It may perhaps be argued that if the erupted matter be thrown higher, dry land *must* result. Yes, but will it be *permanent*? or will it not rather resemble those volcanic islets which are of not infrequent occurrence in the present day, and which have invariably disappeared again beneath the waters in a few months at the farthest? The question, however, is not as to whether temporary volcanic islands could be formed, but whether permanent dry land could be so produced; for it must be remembered that the mass upheaved will be sustained only so long as the internal heat continues at the degree which caused the outburst, and that, as it has interiorly no permanent foundation, it must always be liable to re-sink sooner or later towards the centre, whenever the incandescent matter shall have parted

with a portion of its heat and become quiescent, for it must be evident, that if the heat decreased, as decrease it certainly would, consequent on the escape of a portion of the fused matter, contraction would ensue, by which either an internal hiatus would be produced or the elevated matter would subside. Instances of this kind are known to have occurred where volcanos are situated in the stratified formations. "Cavities corresponding to the quantity of matter thrown out, will sometimes occur not far beneath the surface; and when the weight above shall overcome the resistance below, either suddenly from a violent convulsion, or slowly from gradual change, the mass above will fall into the abyss beneath and matter be, in some measure, restored to its place. Among volcanic changes it is, by no means, uncommon to hear of hills disappearing and being converted into lakes. The most memorable example perhaps of the disappearance of a volcano, is that which took place in Java in 1772. The Papandeyang, on the south western part of the island, reputed one of its largest volcanos, was observed at night between the 11th and 12th of August, to be enveloped by a luminous cloud. The inhabitants, being alarmed, betook themselves to flight, but before they could all escape, the mountain fell in, accompanied by a sound resembling a discharge of cannon. Great quantities of volcanic substances were thrown out and carried over many

miles. The extent of ground thus swallowed up, was estimated at *fifteen miles by six*. Forty villages were engulfed or covered up by the substances thrown out, and 2,957 persons were reported to have been destroyed.”\*

If then the present vast ranges of mountains rest on similarly inconstant bases, they are liable to re-sink into the abyss beneath at any moment, and so destroy whole Nations; for if the central heat were to decrease in degree, or if it found vent in any other direction, those ranges, from the loss of their basal support, would naturally sink down by their own weight towards that centre from which a portion of them originally arose, and thus, in their descent, would overwhelm the Tribes and Nations which inhabit them. If indeed such effects take place in mountains of comparative insignificance, how much rather ought we to expect them to take place with the larger and weightier masses? It has been objected that the irruption of fused matter from the centre would not necessarily result in a vacuum or hiatus, because such matter had existed under great pressure, and when a portion was removed the pressure would be lessened, and the remaning mass would expand to fill the hiatus. In proof of this it has been urged that a bladder, under ordinary atmospheric pressure,

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\* De la Beche's Geological Manual, p. 134.

full of air, if half emptied, and placed under the receiver of an air pump, will still be full. Now this seems true only so long as the heat continues to any considerable degree, but if that should decrease, then either a vacuum or a subsidence would appear to be inevitable; so that no sure and stable foundation would be produced even by allowing due weight to the objection, for the possibility of a re-sinking of the upheaved matter would still hang *in terrorem* over us; to say nothing of the fact that such a condition of the internal parts of the Earth, would be in direct opposition to the results of those experiments which have placed the solidity of the centre beyond a doubt. The objection, in as far as relates to the bladder, is moreover very far from being applicable, for, although the matter had existed under great pressure, it would, by no means, follow that when a portion of it was ejected, the pressure would be *lessened* and the remainder expand to fill the hiatus; but, on the contrary, that the *internal power of resistance being lessened*, the continued exertion of external pressure must produce a subsidence or collapse. If a nearly empty bladder be placed under a receiver from which the air is then exhausted, the air remaining in the bladder will of course expand; but this is owing to *the removal of external pressure*, and is therefore, by no means, a parallel case; for the heated matter of

the Earth is expelled without there being any diminution of external pressure. Here the result seems far more nearly to resemble the squeezing of the air from the bladder, which naturally collapses under the pressure, as the *internal resistance ceases*.

These observations then appear to show that the mountains of the Earth, could never have been supported for any time, by any central combustion or heat, *unless* other conditions, of which we shall presently speak, had likewise existed; and the arguments used to refute this doctrine all tend to prove that the mountains are supported by solid matter; and they give further proof of the correctness of the scientific experiments of Dr. Maskelyne and others, to which we have above alluded.

From a still later experiment on the mean density of the Earth, it has been found that "besides the confirmation of some of the most material points of the theory of gravitation which results from this experiment, it furnishes a presumption of the strongest kind that the Earth is solid to the centre, and not as many have supposed in every age, a hollow shell. The mean density  $5\frac{2}{3}$  is very much greater than that of the substances which abound at the surface. All common rocks are under 3, and nothing under the ores of the heavier metals comes up to  $5\frac{2}{3}$ . The Earth is as massive as if it were all composed of silver ore, from the centre to the circumference,



so that there must be an increase of density towards the centre. If those who think the Earth to be a shell were to presume that its solidity ceased at five hundred miles below the surface, they would then be compelled to give to the terrestrial matter, one part with another, a density greater than that of mercury, in order that the whole shell, the hollow part included, might have the mean density which is found by this experiment.”\*

It appears to be a point admitted by geologists that the waters were caused to retire from that portion of the mineral globe which was destined to become *dry land*, by the formation of vast depressions into which the waters would have naturally subsided. Reflection, however, must point out that such depressions would not of themselves be sufficient to do more than cause a very imperfect drainage, or rather, it might be more truly said, that they would be wholly inadequate to draw the waters from any one particular spot, but would act *generally* in lessening the depth over the surface of the entire globe; so that no dry land could possibly appear until a depression or depressions had been formed capacious enough to contain all the waters of the ocean, and this simply because it is a well known law of Nature

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\* “Penny Cyclopædia”—Weight of the Earth. See also “Experiments with the torsion rod for determining the mean density of the Earth, forming Vol. xiv, of the Memoirs of the Royal Astronomical Society, by Francis Baily, Esq., London, 1843.”



PLATE 2.

FIG. 2.



for water to preserve its own level; to say nothing of the fact that all such depressions on the surface of a solid globe, must necessarily imply the previous removal of matter from the interior. To illustrate this reasoning let us assume A (Fig. 2.) to be the Earth surrounded by B B the primeval ocean. Then let C be a depression in order to draw off the waters; it is evident that the ocean B B would gradually subside from all parts equally until the depression C was filled, and the water stood at a lower level, as at the dotted line D. The effect in this case, supposing such depression to be possible, would be merely to lessen the depth of water around the spheroid generally, but no *dry land* could possibly appear.

Although it is generally admitted that where elevation has taken place, there too must an attendant depression or subsidence ensue, yet no writer seems to have considered it probable that such subsidence was *the result* of corresponding upheavements or elevation of strata on the opposite or antipodal surface of the Earth; and yet this would appear from the tendency of the foregoing remarks to be likewise necessary to the production of dry land; for, as we have seen that neither upheavements from the centre (Fig. 1) nor superficial depressions (Fig. 2) when taken singly, could possibly have produced the desired object, it becomes necessary to inquire whether their conjoint effects

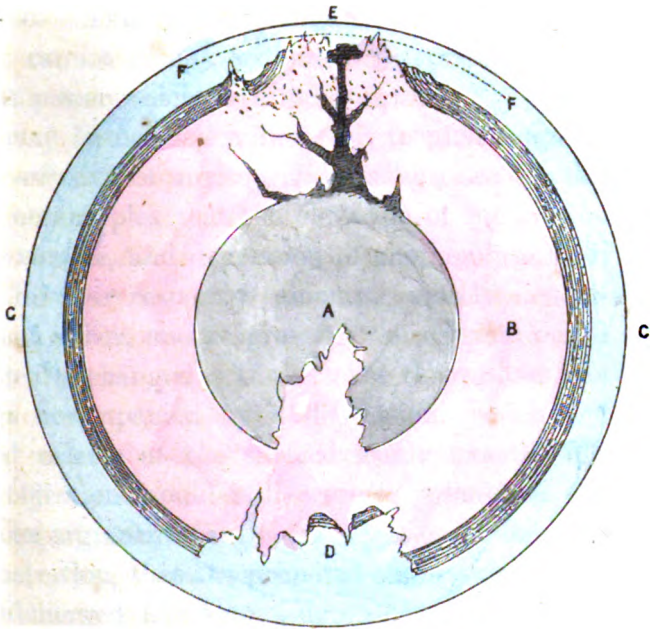
might not have done so. Let us then look into the probability of this apparently new theory.

If we suppose, that simultaneous with the elevation of a mountain range on one surface, a depression at the antipodes were to occur; it seems to be then apparent that the depth of water being diminished in a degree corresponding to the magnitude of the disruption, would cause some dry land to appear above the surface of the water,—namely, the summits of the uplifted strata. We may again illustrate this observation by the following diagram. Let A B (Fig. 3) represent the Earth surrounded by C C the primeval ocean, and let D be a depression and E a corresponding antipodal elevation. It now appears that if the waters were to subside into D, in quantity sufficient to reduce the general depth of ocean from C C to F F, the tops of the mountains or dry land would appear above the waters at E, thus forming islands amidst the waste of seas. It may possibly be objected that if upheavements took place as here supposed, the mountains would still be liable to re-sink as soon as the exertion of volcanic force had ceased. The results of the movement are, however, in this instance, very different from those which would follow the mere outburst of matter from the centre. No continuance of heat is required to give stability to the mass upheaved, nor is any internal hiatus liable to be formed; the mass is

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PLATE . 3 .

FIG . 3 .



*Imaginary Section of the Earth.*



still solid from its summit to its base, and no sooner does the exciting cause of the upheavement cease, than the heat decreases; the fused mass hardens or solidifies; the rocks which had been subjected to the influence of heat become more consolidated, and the hollow created,—which is at the antipodal base in the depth of ocean, is instantly filled with a dense volume of water which nothing but a counter volcanic movement can displace. Thus the mountains being so firmly based, cannot re-sink without the express exertion of that power which gave them birth.

It may be necessary, however, to guard against the possibility of any objection being raised to this view, on the plea that the elevation of one portion of the surface, and depression of another, would, if equal in their respective amounts, merely neutralize each other, and so preserve the original depth of water unchanged. If the mass thrown out was always accompanied by a depression, which the ejected matter at the surface would exactly fill, such objection would still scarcely invalidate the previous argument, for, let us suppose, for the sake of illustration, that the primeval ocean surrounded the submerged Earth to a depth of one mile, and that mineral matter, capable of displacing one square mile of water, was ejected, the depression and elevation of matter are here supposed to be equal in their respective amounts, and yet dry land



would be visible, for the ejected matter being equal to the volume of water displaced, would rise to the surface of the ocean, and would appear as an island whose surface although on a level with the sea, would still be uncovered, and dry land. But the objection would also be invalid on another account, for a reference to Fig. 3 will at once show that the depression D will not only contain a body of water equal to that which is displaced by the elevated strata at E, but likewise an additional quantity equal to the currents or dykes of volcanic matter ejected from the centre, and whose place there is now occupied by the subsidence at the antipodes. The depression is, therefore, not merely equal to the elevated mass at E, but to the volcanic mass likewise, and will, consequently, be capable of containing a volume of water equal to both those quantities, so that the land at E must not only be laid bare, but raised high above the level of the waters. To those who have paid due attention to the subject, the truth of this line of reasoning must, we should imagine, be fully apparent, for it is a well-ascertained fact in geology, that the volcanic and plutonic rocks traverse the whole of the strata from unknown internal depths, to some height even above the superficial strata ; these igneous products proceed from the central regions of the Earth, and could their dykes and columns be laid open by a section, they would

appear rising up in lengthened masses like gigantic trees, throwing out their branches in every direction towards the surface. It is easy to perceive therefore, that the antipodal depression consequent on the escape of this matter from the centre, will contain more water than the matter ejected at the surface has displaced, for not only is the igneous mass protruded at the surface, but it extends from that surface downwards to an unknown distance; while, therefore, the centre has poured forth this enormous mass, *the elevated portion only* has displaced the water, and, consequently, the depression will contain, not only that which has been so displaced, but likewise a quantity equal in volume to the column which proceeds from the centre to the surface. Granting, therefore, the accuracy of the views here contended for, we have still to show by what natural laws the land was made to emerge from out of the waters.

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## CHAPTER VIII.

CENTRAL DEPOSITS NECESSARILY UNSTRATIFIED ; PROBABLY COMPOSED OF THE METALLIC BASES OF THE EARTHS AND ALKALIES ; VOLCANIC ACTION ENGENDERED AT THE CENTRE ; PRODUCING ELEVATION AND DEPRESSION OF STRATA ; SUBSIDENCE OF WATER AND PRODUCTION OF DRY LAND ; DEPRESSION OF ONE SURFACE SHOWN TO BE A NATURAL CONSEQUENCE OF THE ERUPTION OF MATTER IN AN OPPOSITE DIRECTION ; STRATIFICATION OF THE LOWER ROCKS OBLITERATED BY THE PROXIMITY OF FUSED VOLCANIC MATTER ; PROBABLE ORIGIN OF PRIMARY LIMESTONE.

THE circumstances under which the earlier mineral strata of the globe are supposed to have been accumulated, will show that the first or central deposit must have consisted of a dense mass of the heaviest substances, surrounded by concentric layers of other matter, differing in composition according to the changes which took place in the nature and properties of the waters as precipitation proceeded. The nucleus of the mineral globe must therefore, according to these views, necessarily have assumed the form of a dense ball without stratification, as being a deposit thrown down towards a given central point, from a spheroidal body of waters revolving in space. This deposit of heavy substances was moreover, in all probability, composed of the metal-

lic bases of the earths and alkalies, which, moistened and oxydised by the waters of the ocean, and now surrounded by the ever increasing pressure of other matter which was incessantly collecting around them, would soon have evolved a very considerable degree of heat, which being confined to the central region, by the pressure of the accumulating strata and the surrounding ocean, would have operated in baking the lower deposits, thereby producing cracks and fissures into which, as the volcanic forces increased in power, the sublimed or gaseous metals would have found a passage, where gradually condensing or crystallizing in a cooler medium, they would have given rise to veins of metallic ores. "The heat caused by the combination of oxygen with such substances as potassium and sodium, would not only assist in producing fractures, by giving greater expansive force to the hydrogen, upon the supposition of water percolating to such bodies, but it would often cause the fusion of the inferior portion of the previously oxydised crust, which might thus be forced upwards through the fractures. Now gaseous matter is evolved, and liquid melted rock forced up in so many points on the Earth's surface, under circumstances which render the theory of the percolation of water, to the metallic bases of certain substances so plausible, that it is one we should not neglect; neither should we reject it because it does not afford a good

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explanation of many phenomena which have been attributed to combinations of this kind. We should rather seek to discover the extent to which it may account for observed phenomena when combined with the theory of central heat."\* The ever increasing weight and thickness of accumulating strata must shortly have confined the internal heat to the more central portion of the mass, where, penned up and unable to escape, its power would have been constantly, though slowly, on the increase, and the germs of volcanic force engendered; so that whenever the waters of the surrounding ocean should find a passage to the heated metallic centre, through the cracks and fissures of the rent strata, a vast amount of hydrogen would be generated by the decomposition of the water, the ultimate consequences of which would have been the disruption and upheaving of the superior strata on one surface of the globe; while the simultaneous subsiding or sinking of the antipodal strata would have formed a hollow bed or basin into which the waters of the ocean would necessarily have sunk down, and left the elevated parts uncovered and a dry land: nor will it, perhaps, be very difficult to show, that depression must have been a natural consequence absolutely dependent upon the outburst of matter in the opposite direction; for, if we allow that the

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\* De la Beche's *Researches in Theoretical Geology*, p. 140.

fusion of the central mass caused it to burst through the superincumbent formations in veins and dykes of volcanic matter, we must likewise allow, that while the external pressure at the antipodes of the movement continued unabated,—the internal resistance to that pressure would have been, in a great measure, removed in consequence of the heated mass escaping in the opposite direction; therefore, as the internal heat which caused resistance was all escaping at one particular point, the pressure exerted externally would have forced the antipodal portion of the strata, being the point of least resistance, to sink down from want of a sufficient internal support, and so prevent the formation of any vacuum to which the decrease of heat at the centre might otherwise have given rise; here we have a case somewhat similar to that of the bladder from which the air is expelled by external pressure, the sides collapsing as internal resistance ceases. Thus the same cause produced both effects, or, in other words, the effects were necessarily dependent upon each other.

According to the foregoing views, then, it will be seen that the true seat of volcanic action is supposed to be the central or unstratified nucleus of heavy metallic matter, which had been collected by the laws of gravity and rotatory movement, when the materials were in a yielding condition; and it is easy to perceive that the great heat evolved by this

mass must have exercised great influence in altering and modifying all those strata which were more immediately in contiguity with it. Thus, for instance, the mineral substances in actual contact with it, would have likewise become fused, and would have lost their original stratified form, while those which were further removed from the centre, although baked, indurated and probably disrupted by the heat, would still have retained their stratified arrangement. This volcanic region, therefore, may be called the cradle of those rocks which we term basalt, greenstone, porphyry, &c.; while the granites are composed of those beds which immediately enveloped them, and which, by undergoing fusion, lost all trace of the original form of their deposition, and became converted into plutonic rocks; and lastly, the *gneiss* and *mica slate* systems, may be those stratified beds which, from their greater distance from the heated nucleus, partook of induration and crystallization, but retained their stratification unaltered. That gneiss is sometimes locally devoid of stratification is easily accounted for, supposing this view to be correct, by its holding an intermediate position between the fused mass and the true stratified beds which were in more direct contact with the cool waters of the enveloping ocean. It forms, therefore, a link in the primary series between the true plutonic and aqueous rocks of the system; serving to mark the

point where the internal heat ceased to possess the power of fusion. The occurrence of primary limestone imbedded in the gneiss and mica-slate systems may also perhaps have been thus occasioned; depositions of lime, unlike other aqueous deposits, seem rather to be the effects of chemical, than of mechanical action, and it has often been urged as probable that the limestones, so frequent in different formations, may have been produced by *thermal waters*. Now, at the time when volcanic action commenced within the globe, the mineral strata were mere soft and yielding deposits; and, consequently, as the heat from below began to operate upon them, they would have swelled and blistered up before its influence, causing openings and cavities into which the sea waters would have rushed, and where probably they would have been entombed. These waters being gradually heated by the increasing power of the central mass, would, as a consequence, deposit their lime in the vast caverns into which they had forced a way, and this lime being subsequently acted upon both by the internal volcanic heat, and the pressure of the superincumbent ocean, would, as the gneiss and mica-slate became indurated, be converted into imbedded masses of crystalline primary limestone. This of course is hazarded as a mere conjecture, but it is one which would appear to accord well enough with Dr. Hutton's views respecting the

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formation of this mineral, for he suggested that limestone, like every other rock, had been subject to fusion; to this it was objected that when limestone was heated, the carbonic acid gas was driven off, and the remaining quicklime became *infusible*. He replied, that if at the time of fusion the limestone was subjected to great pressure, so as to confine the carbonic acid gas and prevent its escape, it would probably act as a flux upon the quicklime and convert it into crystalline limestone. This suggestion was at the time looked upon as extravagant, and was, therefore, little heeded, yet subsequent experiments have fully established the truth of the doctrine. Now the lime deposited by the supposed thermal waters above alluded to, was, at the time when heat and pressure were applied to it, precisely under those circumstances which precluded the escape of the carbonic acid gas, which, by acting as a flux, would naturally convert the calcareous deposit into imbedded masses of compact and crystalline rock.

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## CHAPTER IX.

REVIEW OF THE FOREGOING REMARKS ; ENORMOUS PRESSURE OF THE ATMOSPHERE ; SEQUENCE OF EVENTS PROVED TO BE NATURAL ; VOLCANIC EFFECTS OF WATER ADMITTED TO THE HEATED CENTRE ; CONDITIONS NECESSARY TO PRODUCE AN EARTHQUAKE ; VOLCANOS SERVE AS CHANNELS FOR THE ESCAPE OF INTERNAL HEAT ; LAND AND WATER PLACED AT THE ANTIPODES OF EACH OTHER ; FORMATION OF BOULDER AND ERRATIC BLOCKS ; THE RUGGED OUTLINE OF PRIMARY MOUNTAINS CAUSED BY SUDDEN REFRIGERATION AND EXFOLIATION ; FORMATION OF NON-FOSSILIFEROUS OR CUMBRIAN SLATES.

WE learn from the narrative of Creation as unfolded in the first chapter of Genesis, that on the third day, "God said, let the waters under the Heaven be gathered together unto one place, and let the dry *land* appear; and it was so. And God called the dry land Earth; and the gathering together of the waters called He seas; and God saw that it was good." We have likewise seen in the three foregoing chapters of this work, how the division of land and water was, in all probability, effected, and it now only remains for us to endeavour to show why this third creative period was selected for that operation, and how strictly, in accordance with the truth, is the sequence of events recorded by the

inspired historian. In order the better to do this, it will be necessary, in some measure, to retrace our steps. It has been urged that the material elements of the whole system must have had simultaneous origin, and that, at the precise period when the mineral globe had been deposited in the centre of the revolving fluid, the heavenly bodies were then likewise, for the first time, rendered capable of diffusing heat; the immediate effect of which was to beget an evaporation from the waters which surrounded the Earth; and those vapours combining with the hitherto unmixed atmosphere, produced the vital air, which in turn, by scattering and reflecting the solar rays, gave origin to that active and visible effect which we term daylight; and thus we arrive, by a natural sequence of events, at that particular point of time in the history of the Earth, which formed the first terrestrial day.

On the following morning when the Sun again prepared to run his daily course, the power of his vivifying rays exerted on the saturated atmosphere, caused the expansion of that body to take place, by which means the mists which hung heavily over the surface of the waters were enabled to rise higher into space, where, forming a canopy of clouds that screened the Sun from actual view, they left the lower regions of the now perfected atmosphere, a clear and unclouded "*firmament*," which, dividing the evaporated waters from those

of the ocean, terminated the operations of the second day.

It has likewise been suggested that during the long period which elapsed while the mineral globe was in course of precipitation and deposition in the bosom of "the deep," a chemical heat must have been engendered in the central heavy mass of metallic oxydes, which, in all probability, formed the nucleus of the planet, and that, through the agency of this heat, the lower strata became gradually more and more compact and indurated, while cracks and fissures were the natural consequences of the expansion of the internal heated matter. The germs of volcanic action were thus engendered and kept alive in the interior of the Earth, although its violence had not yet arrived at that degree of force which afterwards enabled it to disrupt and upheave the strata. In this state of progressively increasing power it must have continued through the long period of years known as "*the beginning*," but no sooner was the effect of heat felt upon the surface of the planet, through the active operation of the solar ray causing the expansion of the newly formed atmosphere, then the great weight of atmospheric pressure superadded to that of the mineral strata, and of the superincumbent ocean which already pressed enormously upon the central mass, increased the power of the internal heat by condensation, to such a degree of

intensity, that the expansion of the nucleus, causing the strata to split and swell up, gave passage to the waters of the ocean, which, percolating to the incandescent centre, and acting upon the metallic bases or intensely heated lava within, suddenly produced by their decomposition a vast amount of hydrogen, and the hitherto smouldering volcanic forces, now roused into terrific action, suddenly burst forth with irresistible vigour towards the surface, rending and upheaving in their progress the superior strata of the Earth, whose surface from thenceforward became varied with hill and dale.

The order and sequence of these events as related by the historian, are not only thus seen to be natural, but each operation appears to be absolutely dependent for its production upon the others, so that the creation of active heat in the heavenly bodies, at the particular point of time when the mineral globe was just completed in the bosom of the waters, gave rise to every other operation; successively begetting as it were, by its action upon the waters, evaporation, atmosphere, daylight, the firmament, volcanic action, and dry land.

To those who have hitherto been in the habit of regarding the operations of each particular day as the unavoidable and instantaneous results,—not of a natural law, but of an Almighty fiat, as sup-

posed to be shown in the words of the text, where it is affirmed that "God *said*, Let there be light," and "God *said*, Let there be a firmament,"—it may be necessary to explain that the words of the text do not seem to insist so much upon God's having actually spoken with the tongue and voice of a man, as that *He willed* that His own regulating *laws*, which He had established "in the beginning," and which do *now* still continue to operate under His guardian care and guidance,—should, on each of the specified periods, produce the effects recorded in the Scriptures. The historian, in fact, merely assures us that the events spoken of were the results of those natural laws to which matter was subjected, and that they took place in the order related, and could not have been produced in any other order, nor at any other time. "We are not to conceive of the Creator as standing over chaos and uttering these words,—'Let there be light.' The language does not demand this literal interpretation. For Him to speak is to *will*. This is frequently the idea attached to the term, 'said,' when applied to God; this appears to be its import throughout the narrative."\* Each operation was no doubt an act of the Creative power, and at the fitting time each was produced under His superintendence, as is clearly indicated by the words "and

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\* Wight's 'Mosaic Creation.'

God *saw* that it was good;"—that is, God permitted His laws to produce certain effects, while He supervised the operation, or saw that the effects were good and proper. Secondary causes produced the effects, but those secondary causes are the instruments with which God works,—namely, the acknowledged laws of Nature, which still, to this day, are operating in like manner to maintain or renew that to which formerly, under God's guidance, they gave origin. God still works (so to speak) by means of His laws, whose operations He superintends and guides, and therefore is it that we justly declare "His Providence to be over all His works,"—words which, under any other view, would be without a meaning. If then these laws were imposed by the Creator "in the beginning," and if their tendency still is to produce the same results as those recorded by the historian, surely we would be scarcely reasonable in denying that they actually produced those effects. The whole difficulty of admitting the operation of natural laws, in preference to the mode of acting by a fiat, arises out of the mistaken belief generally entertained, that the first recorded day of Genesis was the actual commencement of the creation of our planet, and, consequently, that each operation must have been performed by an express interposition of Almighty agency; whereas, by understanding the first and second verses, or first paragraph of

Genesis to be, what in reality they are, an abstract statement that "In the beginning,"—long anterior to the first day, God created the matter of the universe, and that such matter being without definite arrangement, was in a state of confusion,—we can at once perceive that the present regulating laws must have been coeval with the matter on which they act, and therefore, that the operations of the week of Creation were, as far at least as relates to the inorganic world, the natural and unavoidable effects of those laws.

Nor can it be urged that the results here contended for are unnatural, for, if we admit that the central heavy substances of which the Earth is now known to be composed, are such as are capable of decomposing the water that finds admission to them, we shall at once be furnished with every condition necessary to produce volcanic action. "That an expansive force acting from beneath is the approximate cause of earthquakes, can scarcely be denied, and the prodigious power of steam, when suddenly generated, seems equal to their production, if the quantity be sufficiently great. It is said that a single drop of water, falling into a furnace of melted copper, will blow up the whole building. This may be an exaggerated statement, but the prodigious force of steam at high temperatures is well known, and there can be



no difficulty in admitting that if a current of subterranean water were to find access to a mass of lava many miles in extent and most intensely heated, it would produce an earthquake more or less violent, in proportion to the quantity of steam generated, and its distance from the surface. When the hydrogen gas exploded in a mine near Workington in Cumberland, a shock like that of an earthquake was felt by ships in the river, at two miles' distance."\* Now the conditions required to produce an earthquake appear to be precisely those which existed at the period of which we are treating, for it has been shown that the internal mass must have been held in a state of intense heat by the chemical action going on within, and by the condensation of that heat by the great and increasing pressure from without; and, if a drop, or at any rate a small quantity of water, admitted into a furnace, would have the effect of blowing up the whole building, how evident does it become, that the admission of subterranean currents of sea water, through the fissures of the strata to the internal bed of intensely heated lava, must have caused the instantaneous outburst of volcanic matter and the upheavement of the mountains of the primeval Earth. Simultaneous with the outburst of matter, in any given direction, must likewise have been

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\* Bakewell's Introduction to Geology, p. 29.

the corresponding subsidence at the antipodes, for as the pressure was equally exerted over all the surface, it would happen as a necessary consequence, that whenever internal resistance ceased by the escape of heat and became less in degree than such pressure, the weight would force in the strata to re-fill the space to which the escape of matter from the centre would otherwise have given rise. Such subsidence therefore formed hollow basins into which the waters were drained down as the antipodal disrupted strata arose, and the waters being thus literally "gathered together into seas," the summits of the uprising mass would have formed the first dry land;—while the centre of the Earth became again solid, as the violence of the volcanic action abated and the internal heat became quiescent. (Fig. 3.)

It may possibly be objected that as the pressure and other conditions which had caused the outburst still continued to exert the same influence on the terraqueous globe, volcanic action could not have ceased; nor in truth does the theory require that it should altogether do so, for when once the internal heat had formed channels of escape to the surface, its violence would have decreased in consequence of the volcanos serving as vents or safety valves. Although, therefore, the internal temperature would still remain high, yet its violence would have

ceased to convulse and agitate the globe, except under certain local and occasional conditions which might, from time to time, as at present, produce earthquakes and active volcanos. The stratified formations, moreover, furnish abundant evidence that during the periods when they were being formed, volcanic action was frequent and even violent, and we are led to infer that land was gradually added to land even from the beginning of terrestrial time, and not that it all arose from beneath the waves at one sudden and terrific outburst. The continuance, therefore, of the external pressure, while it served to keep alive the heat which was engendered within, by no means demanded also the continuance of that heat at the precise degree of intensity which had caused it to force up the dry land; because now that vent or egress had been obtained through the shattered strata, the heat would always have found means to escape through the volcanic chimneys which it had already formed, ere it could arrive at that pitch which would again enable it to rend the Earth asunder. Since that first period of convulsion, volcanic action has been frequent and violent, causing vast changes in the relative distribution of land and sea, and, by the consequent reduction or change of temperature in climates, destroying the organic beings of successive eras; and it appears to be only since the termination of

the tertiary era, that such action has become at all quiescent.

“ The connection of earthquakes with volcanos was noticed by ancient writers, and the latter were properly regarded as the openings through which the inclosed vapour and ignited matter, that occasion earthquakes, found a passage. Strabo in his geography states, that the town of Rhegium situated on the Italian side of the straits of Messina, was so called according to Æschylus, from the circumstance, that the island of Sicily was rent off from the continent by earthquakes. Proofs of this arise out of the phenomena attending Etna and other parts of Sicily, the Lipari islands, and even the opposite continent. Now, indeed, when craters are opened through which fire and ignited matter and water are poured out, it is said that the land near the straits is seldom shaken by earthquakes; but formerly, when all the passages to the surface were obstructed, the fire and vapour confined in the Earth occasioned frequent earthquakes, and the land being rent, admitted the ocean. At the same time Prochyta and an adjacent island were also torn off from the continent, while other islands rose from the ocean, as frequently happens at this day.”\*

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\* Bakewell's Introduction to Geology, p. 426.

The views here advocated will also be found to give weight to an hypothesis to which observation has of late years given rise, namely, that volcanos, even in distant parts of the world, are connected with each other far below the surface. This hypothesis is supported by many well authenticated facts, which prove it to be no wild speculation, and the theory here proposed would tend to show that if volcanic action originated in the central regions of the Earth, such connection must naturally and necessarily exist. "The extent to which earthquakes produce sensible effects on the waters of springs and lakes in distant parts of the world, is truly remarkable. During the earthquake of Lisbon in 1755, almost all the springs and lakes in Britain and in every part of Europe were violently agitated, many of them throwing up mud and sand and emitting a fetid odour. On the morning of the earthquake, the hot springs of Toplitz in Bohemia, suddenly ceased to flow for a minute, and then burst forth with prodigious violence, throwing up turbid water, the temperature of which was higher than before. It is said to have continued so ever since. The hot wells at Bristol were coloured red, and rendered unfit for use for some months afterwards. Even the distant waters of lake Ontario in North America were violently agitated at the time. These phenomena offer proofs of subterranean communica-

tion under a large portion of the globe; they also indicate that a great quantity of gas or elastic vapour was suddenly generated and endeavouring to escape.”\*

But admitting the truth of what has been urged above, it will yet be seen that one necessary consequence of the depression of strata, would be to place land and water at the antipodes of each other; and such, in fact, is actually the case; consequently, we derive a still more convincing proof of the general correctness of the theory proposed. In the present distribution of land and water should there appear to be exceptions to this rule, they would not invalidate the general truth of the theory, because, it must be remembered that it is the antipodes of the *mountain ranges*, and not of land in general, that must decide the question, for we know that much, if not all, of the lowland parts of our continents and islands, have either been laid bare by the violent displacement of the water, by the actual uprise of the mountains, or that they have been formed or extended by alluvial deposits. Still the almost universal occurrence of water at the antipodes of all land, must assure us of the existence of some cause to produce this particular and remarkable arrangement; and if it be not such as we have stated, to what are we to attribute

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\* Bakewell's Introduction to Geology, p. 425.

the phenomenon? Granting, however, that all land has water at its antipodes, it will not likewise follow that all water is opposed to land; because, although the chief or principal subsidence would be found at the antipodes of the outburst, other minor depressions would, no doubt, be of frequent occurrence in other parts, as refrigeration and internal contraction ensued. Now the land being for the most part confined to the northern hemisphere, at once points out that the corresponding depression or subsidence must be looked for in the southern hemisphere, where, accordingly, we find the water to prevail exceedingly and almost to the exclusion of land; here, in fact, is that ocean which sunk down to fill the southern depression as the land rose upwards in the north. That such was the direction of the last great general volcanic movement is likewise proved beyond a doubt by the traces which the retiring waters have left upon the land, all these furnishing, according to the testimony of the best observers, irresistible evidence that the retiring currents passed from north to south. These evidences consist in the manner in which erratic blocks and boulders are distributed over the countries of the north, a distribution which not only clearly points out the direction taken by the displaced waters, but which likewise establishes the irresistible and unlimited power of the transporting agent.

If then the central mass be truly the *locus* from whence volcanic matter issued, as various phenomena would seem to declare; and if such matter was then not only itself in a state of fusion but tended likewise to fuse the immediately adjoining strata, and to convert them into granite, it will follow that as the incandescent currents burst upwards through the superior strata, to the surface then surrounded by the ocean, the contact of those cool waters, *by causing the sudden and instantaneous refrigeration and contraction* of the uprising heated surface of granitic lava, would have split it into blocks and fragments,—the exfoliations of which, as they fell amidst the tumultuous and retiring waves, would speedily have rounded off their angles and caused them to assume that water-worn appearance, which has been productive of so much discussion in modern times. Such blocks and debris hurried along, according to their weight and magnitude, to various distances from the proper sites of their parent rocks, would constitute in after days the boulders and true erratic blocks of geologists, while the finer particles and loose earthy sediments produced by the exfoliation and attrition of the uprising masses, would have furnished abundant materials for fresh strata, which being disposed by the sorting of the retiring waters above the primary stratified rocks, would naturally constitute a transition or non-fossiliferous



series of conglomerates and argillaceous slates, composed of the same materials as the rocks from whose denudation and disintegration they had been produced. Are not the schists of the *Cumbrian* or lowest transition strata precisely similar?—and may we not, therefore, with every probability of truth, hazard the conjecture that they were produced by causes and under circumstances similar to those we have endeavoured to explain? The rugged peaks usually presented by granitic ranges have sometimes been triumphantly pointed out as furnishing proofs that the mass must have uprisen in a solid state, inasmuch as a fused rock would have assumed a stratified disposition like modern lava. Now, that granite was once in a state of fusion is proved by the veins which it sends up into the strata above it, and, therefore, if the foregoing remarks are well founded, it will be apparent that while the mineral mass may have been upheaved in the state of a thick and intensely heated paste, the sudden refrigeration and contraction of its surface, by giving origin to erratic blocks, would have caused the denuded and shattered summits of the granitic range to exhibit those rugged spires which are characteristic of such formations.

At the end therefore of this first portion of the third creative day, “we may suppose that there existed a globe, whose surface exhibited alternations of land and water; the land having in some

places as distinctly stratified an appearance as it has at present, and the thick masses of strata resting on huge bosses and peaks of granite and other igneous rock: but all was then bare and desolate; not a moss nor a lichen covered the naked skeleton of the globe; not a sea-weed floated in the broad ocean; not a trace existed even of the least highly organized animal or vegetable; every thing was still, and with the stillness of absolute death. The Earth was indeed prepared, and the fiat of creation had gone forth; but there was as yet no inhabitant, and no being endowed with life had been introduced to perform its part in the great mystery of creation.”\* But the dry land had now emerged from out of the waters which enveloped it, through the instrumentality of volcanic action, resulting from the operation of those laws which the Creator had imposed upon matter in the very outset of “the beginning,” and which had tended, through that long lapse of ages, to render the Earth a fitting habitation for those organized structures which it was at length in His good time, the pleasure of Almighty Goodness to create.

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\* Ansted's 'Ancient World,' p. 21.

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## CHAPTER X.

THEORY OF AN INTERNAL ABYSS IRRECONCILABLE WITH FACTS ;  
 TRUTH OF THE SCRIPTURAL STATEMENTS PROVED ; CREA-  
 TION OF THE VEGETABLE KINGDOM. . .

IN the seventh volume of the Bridgewater Treatises, the venerable Mr. Kirby has endeavoured to show that the waters which originally covered the Earth, were drawn down into some central abyss. This doctrine, however, is not only quite unsupported by Scripture, but meets likewise with a ready refutation from those experiments on the mean density of the Earth which leave no room to doubt that the planet is solid, and composed, internally, of heavy matter. The foregoing remarks will, moreover, show that the waters of the primeval ocean were "gathered together into seas," by the formation of depressions on the surface and at the antipodes of the dry land, proving thus the strict truth, and determining the sense of those passages of Scripture which allude, as in the second commandment, to "*the waters under the Earth.*" There is nowhere any allusion made to the waters *within* the Earth, as Mr. Kirby's views would require, but in all those passages in which reference is made to the original body of oceanic waters, they

are mentioned, first, as “*the deep*;” then as the waters *above and beneath the firmament*; the waters denominated “*seas*;” and lastly “*the waters which are under the Earth*.” That these also were “the fountains of the great deep,” which were broken up at the time of the general deluge, when the waters returned to cover the Earth as with a mantle, we shall endeavour to prove in a subsequent chapter. It may, however, be as well in this place to notice Mr. Kirby’s views more at large in order to remove those doubts on the subject, to which the opinion of so respectable an authority might otherwise give rise. In every instance where this eminent writer quotes authority in support, as he imagines, of his hypothesis, it will be seen, that while allusion is distinctly made to “the waters *under* the Earth,” there is no mention whatever of waters entombed within its bosom;—“the Word of God,” he says, “in many places, speaks of *an abyss of waters under the Earth* as distinct from the ocean, *though in communication with it*, and also as contributing to form springs and rivers. Scientific men in the present day appear disposed to question this; the geologist, though he may regard the granitic strata as forming the base, as it were, of the crust of the Earth, seems rather to view it as containing a focus of heat, than a magazine of infinite waters. In the book of Genesis, in the blessings pro-

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nounced both by Jacob and Moses, previous to their death, upon the tribes of Israel, in that relating to Joseph, amongst others are mentioned—The blessings of *the deep* that lieth *under*, or as the same words are more literally translated in Moses' blessing—The deep that *coucheth beneath*. The prophet Jonah, in the prayer he uttered when incarcerated in the fish's belly, has these words, *I went down to the bottoms of the mountains; the Earth with her bars was about me for ever*. A parallel expression is used in Moses' Song—*A fire shall burn to the lowest hell—it shall set on fire the foundations of the mountains*. This last passage shows that the *Hades* of Scripture—usually translated *Hell*, but distinct from the *Gehenna* or Hell of the New Testament—is synonymous with the Abyss. As is further proved by the following passage of the book of Job. *Hast thou entered into the springs of the sea? or hast thou walked in the search of the abyss? Have the gates of death been opened unto thee, or hast thou seen the gates of the shadow of death?* In this passage the *springs of the sea*, the *abyss*,—the *gates of the shadow of death*, seem nearly synonymous, or to indicate, at least, different portions of the womb of our globe. The bottomless *pit*, or rather the *pit of the abyss* of the Apocalypse, also belongs to the same place; the word rendered *pit* means also *a well*. Schleusner, in his Lexicon, translates the

phrase by *puteus seu fons abyssi*, so that it seems to indicate a mighty source of waters. But as the terms *abyss* and *great abyss* are applied to the receptacle of waters exposed to the atmosphere as well as to those which are concealed in the womb of our globe, it is evident that they form one great body of waters in connexion with each other.”\*

Now, in all these instances, so far from perceiving any allusion to a *central* abyss of waters, we rather gather a confirmation of the views unfolded in the foregoing chapters, for the antipodal depressions into which the waters of the primeval ocean are supposed to have been “gathered into seas,”—appear to answer precisely to the “abyss of waters *under* the Earth, though in communication with the ocean,”—as set forth by Mr. Kirby—while the expression “*the deep that lieth under*,”—or—“*that coucheth beneath*,”—appears to be in strict accordance with our views,—the words “*coucheth beneath*,” aptly and accurately describing those waters which are couched or bedded in the antipodal depressions,—and not in the centre of the Earth. So again the words of Jonah, “I went down to the bottoms of the mountains; the Earth with her bars was about me for ever,”—clearly

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\* Bridgewater Treatise—Kirby on Animals, Vol. I, Appendix, p. 374.

allude to the depressions in the depth of ocean, which being at the antipodes and therefore, as it were, supporting the elevated matter, are, in fact, situated at *the bottoms of the mountains*; while at the same time those depressions may truly be termed "*the bars of the Earth*," from their acting as barriers to the return of the superfluous waters, and restraining them from covering the elevated land. Again the words "*the pit of the abyss*," or "*the well of the abyss*," are aptly illustrative of *depressions*, which are truly the wells or fountains of the great deep in which the superabundant waters of the ocean are pent up; while, at the same time, they "form with the waters which are exposed to the atmosphere, one great body in connexion with each other." There is, moreover, one very important fact in regard to the present question, which appears to have been uniformly overlooked or disregarded both by Bible Critics and Cosmogonists, but which may, nevertheless, be entitled to some attention, and may not improbably help us very materially in coming to a right conclusion on the subject. The fact alluded to is this, the Jews, to whom, it must be remembered, the narrative was addressed, entertained a firm belief, as did other nations long after them, that the Sun revolved daily round the Earth, while the latter remained *stationary*; hence appears to have arisen the distinctions between the "*Heaven above*," as

applied to the space overhead; "Earth *beneath*," that is, beneath the heaven; and "waters *under the Earth*." Entertaining, as they did, the notion that the Earth stood still, these distinctions at once strike us as being perfectly natural, for the space called Heaven, was seen spreading out *above* them, while beneath it was the dry land on which they dwelt; and the waters, consequently, being neither above them, nor yet covering the land, were naturally regarded as being *under* or beneath them. And while the correctness of this view of the case becomes the more apparent and satisfactory, the question of a central abyss seems altogether negatived by the fact that the Earth *was not then known to be a spheroid*, but was regarded as a flattened plane diversified with mountains and bounded by the ocean; consequently, while we can readily conceive that the water may have been regarded as "*couching under*" the Earth; it is quite impossible to conceive the idea of "a central abyss," inasmuch as to their ideas *there was no internal centre!*

If, moreover, it has been correctly stated that dry land and water are at the antipodes of each other, we must at once perceive that the one is in reality *under* the other, and that therefore the *truth* was actually revealed to the Jews, although from the ignorance of those times, they were unable to



appreciate it. In respect to the words "Heaven" and "Hell," the difference of locality may have arisen, not so much from an intention of actually assigning any particular places to them, as from their opposite characters rendering them, as it were, the very antipodes of each other, the former being regarded as a *state* (not place) of perfect bliss, the latter of perfect misery.

The waters, however, having been now confined within those bounds which they were not thenceforward to be permitted to transgress without the direct will and interposition of Him, by whose power they were restrained; and the dry land having been made to appear above the surface of the waters, it was now deemed fitting to furnish it with the vegetable kingdom; and therefore God willed that "the Earth should bring forth grass, the herb yielding seed and the fruit-tree yielding fruit after its kind, whose seed is in itself upon the Earth, and it was so. And the Earth brought forth grass, and the herb yielding seed, after its kind; and the tree yielding fruit whose seed was in itself after its kind; and God saw that it was good; and the evening and the morning were the third day."

Thus simply and beautifully does the Mosaic record describe the creation of the vegetable kingdom. The first portion of this day was devoted to the uplifting above the surface of the ocean, of that

Earth, which, although its material elements had been created "in the beginning," was not made ready for the reception of the vegetation which was destined to clothe and adorn its surface, until this, the first portion of the third creative period; when, therefore, the waters had been gathered together into the places appointed to receive them, and had left some portion of the surface uncovered, the remainder of the day was, we are informed, devoted to the creation of the vegetable world. Obedient to the Divine Command, both plant and tree at once sprung into existence, clothing the surface of the new born world every where throughout its wide extent and various climes with vegetation. Those fossil plants of enormous growth which are now so abundantly found imbedded in the earlier strata, were all called into simultaneous being, each springing up in those climates, soils and situations for which they were peculiarly and particularly adapted. There was no gradual and progressive creation through an indefinite lapse of years; no tardy diffusion and modification of species by climate or change of soil, but obedient to the mandate of an Almighty will, the Earth at once put forth her fairest treasures; the shrubs, the forest trees, each after its kind, endowed with the power of increasing and propagating its species through countless ages, instantaneously started into life. The sea, the river, the lake, marsh, hill

and vale put forth their various species; through every clime, through every region of the infant Earth, an abundant vegetation at once sprung up, adapted to the purposes of its creation, and for the sustenance of that animal life with which the Earth was presently to be furnished.

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## CHAPTER XI.

VARIOUS OPINIONS REGARDING THE PERIOD OF THE CREATION OF THE HEAVENLY BODIES ; SUPPOSITION THAT THEY WERE CREATED ON THE FOURTH DAY, NOT SUPPORTED BY SCRIPTURE ; REASONS WHY NOT APPARENT TILL THE FOURTH DAY ; SEQUENCE OF RECORDED EVENTS PROVED TO BE TRUE AND NATURAL ; PROOF OF THE CREATION OF THE HEAVENLY BODIES ON THE FIRST DAY ; THEIR CREATION ON THE FOURTH DAY REFUTED.

OBJECTIONS, arising out of the apparent difficulty of reconciling the operations of this fourth day, with the declaration made in the third verse of Genesis regarding the production of light on the first day, have not unfrequently been made against the truth of the Mosaic record ; while many have attempted to reconcile the events of both days, by supposing that the light produced on the first of these periods, was altogether independent of the Sun. There seems, indeed, to be a very prevalent, although decidedly erroneous, belief, not only among laymen, but also among eminent divines, that the Sun and other heavenly bodies were *not created* until the fourth period. That such a belief is founded on a misconception of the events of the two days in question, we have already laboured to prove in the third and fourth chapters

of this work, yet, lest some doubt on the subject should still remain, we will further endeavour, in this place, to set the matter in its true light.

The belief that the Heavenly bodies were created on the fourth day, appears to be altogether founded on the fact of their not having been previously separately and distinctly mentioned by name. This silence may, however, in all probability, be attributed to the circumstance that *all* these bodies could not, on any of the previous periods, have been rendered visibly or optically manifest,—partly on account of the dense vapours that began to hang over the planet from the moment when solar heat was first admitted to its surface, and partly because, from the known laws of astronomy, one of them could not possibly have been rendered apparent before this period. We are not told, however, that the Sun and other Heavenly bodies were first created on the fourth day, but only that they were then, for the first time, *appointed* to serve “*for signs and for seasons,*” and this simply because the Moon which was now to begin her visible course as ruler of the night, could not have been apparent to the Earth previous to this time. That the material elements of the Heavenly bodies were coeval in point of creation with the materials of the Earth, we have already endeavoured to establish; and, although on the first day the *effects* of those bodies

became sensibly apparent on the surface of the aqueous spheroid, yet they themselves were necessarily concealed from it by the dense mists and vapours which their heat had generated from the waters termed "the deep." On the second day these vapours were raised by the power of the solar rays *above the firmament*, where they collected into heavy clouds, still effectually screening the Sun itself from view; an effect which we often witness even in the present day. On the third day the dry land arose from out of the waters, and now the great increase of heat diffused through the atmosphere *by radiation from the surface of the Earth*, naturally had the effect of dispelling or dispersing the clouds which hung above the firmament, and so rendered the Sun, for the first time, visibly apparent. On the evening of *this same day*, (which, be it remembered, *commenced* the Jewish *fourth day*,) when the Sun (so to speak) went down, the Moon and Stars became likewise, for the first time, visible to the Earth, and, consequently, this was the fitting and chosen period for appointing all to serve "for signs and for seasons." The sequence of events set forth in the Mosaical narrative is thus again satisfactorily proved to be both natural and true.

We have previously remarked that although in all probability the Sun was obscured by natural causes, during the two first days of the creative week, yet that there does not appear to be the least

necessity for insisting upon it as a positive fact as the Scripture is wholly silent on the subject. Penn, Fairholme and some other writers of the Mosaical school of geologists, have apparently *assumed* the invisibility of the Sun, previous to the fourth day, in order to reconcile the statement of the third verse, wherein is recorded the creation of light, with that of the fourteenth verse in which the whole of the Heavenly bodies are first appointed to the ends for which they were created; these writers contending that although the Sun was in existence on the first day, it was apparent only through its effects of daylight, and that it did not actually shine forth until the fourth day, when it and the other members of the system becoming apparent together, all were then appointed to their several offices. Although willing to concede that it is decidedly most natural to suppose that the effects of the solar ray upon the sea-begirt mineral globe would have rendered it optically non-apparent, yet in order to satisfy cavillers who hold an opposite opinion, it may be well to observe, since it actually makes no difference in the results, that for any thing that is recorded to the contrary, it may have been fully visible from the first day of its existence as a luminary,—and the true reason why the fourth day was selected for the ordering or appointing of the Sun and Moon to become respectively the rulers of the day and night, was not because

the former body had not previously become visible, but because of a very remarkable coincidence, first pointed out, we believe by Granville Penn, and which at once establishes the fact, not only of the Sun's existence on the first day, but likewise of all the other members of the solar system ; so that the question of their *creation* on the fourth day may be fairly and conclusively rejected. The coincidence alluded to is this,—the Moon, according to the observations of Astronomers, does not become apparent to the Earth until the evening of its *third* revolution,—which corresponds with the *fourth* day of the Jewish calendar; from which circumstance it necessarily results that, as that luminary was then *three days' old*, it must have been in existence on *the first day of that week*; and again, as it appears that “the Moon is not luminous itself, but receives its light from the Sun,”\* so it likewise becomes established beyond the possibility of a reasonable doubt, that the Sun was not only in existence on the third day, but that it must have been in existence on the first day, and was therefore truly the source and cause of that light which is recorded as first visiting our planet on that day. The *creation* of any of the Heavenly bodies on the *fourth day*, seems to be thus completely and satisfactorily refuted.

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\* Penny Cyclopædia—Moon.



But further proof that the Sun was in existence with all its present properties on the first day, may be derived from the fact that plants were created on the *third day*. Now, to repeat the arguments already above made use of, the prior existence of the Sun, as compared with that of plants, is established by the fact that the Sun *can* exist without plants; but, that plants *cannot* exist without the Sun. Hence the Sun must have existed with all its present properties before plants were created; consequently, as the vegetable kingdom was created on the *third day*, we have a positive assurance that the Sun must have been in existence *previous* to that day, and could not have been created on the *fourth day*. The Sun could likewise have existed for ever without our atmosphere, but the atmosphere *could not have had origin* without the aid of the Sun; therefore, as the atmosphere was produced on the *first day*, which is proved by the occurrence of *daylight*, the Sun was already in existence at that time with all its present properties, as the Bible leads us to believe. Now, from the laws which govern the Heavenly bodies, we learn that the whole system is so interlinked, and each member is so dependent upon the others, that one and all must have had simultaneous origin, or the system could never have become what it now is. Consequently if this

be true, and the Sun was in existence on the first day, so also was the Moon ; and, therefore, it would naturally become apparent to the Earth, *as it does still*, on the evening of *our third day*, or the commencement of the *Jewish fourth day*, which is precisely the very period assigned by the Scriptures.

It would, therefore, appear from these facts, that while *the creation* of the whole Heavenly system *as luminaries* was enacted on the first day, the members of that system were, on the fourth day, only *appointed* to serve for signs and for seasons, and this particular period was, moreover, selected because the Moon, by the laws of astronomy, could not have been rendered apparent at an earlier day. This reasoning, too, according to the testimony of Hebrew scholars, appears to be fully borne out by the fact that the two words which we translate "*created*," in the third and fourteenth verses, have not the same power or force. The word "*bara*," used in the former, signifying *to create*, while "*asah*," which is employed in the latter, although sometimes used in the same sense, more properly signifies "*to make*" or "*prepare*." Thus, while the Sun and other members in their character of luminaries, may be said to have been *created* on the first day, they were on the fourth day only *made or prepared, or appointed, to serve for signs and for*

*seasons!*\* The word "*lights*" signifies apparent luminaries, as in common language we call *light*, that which is diffused as an *effect*, without referring to the cause; but we call "*lights*" the *sources* of that light, as lamps or candles. The *sensible effect* was produced on the *first day*; the *sensible cause* is to be revealed on this *fourth day*. And, let us now direct our very patient attention to one signal circumstance in the allotment of this fourth day for this especial purpose, the determination of the Heavenly bodies to the uses to which they were severally designed to conduce, as indications of time; a circumstance of internal evidence which confirms and fixes the truth of this interpretation. It is this,—the Moon does not acquire *optical existence*, that is, does not become decidedly apparent to the Earth, by the laws of *Nature*, until the *third evening of its revolution*, according to our common computation, which answers to the *fourth evening* of the ancient *Mosaical day*; our computation connecting the evening with the *preceding* daylight; but by the *Mosaical* computation with the *succeeding* daylight. The fact of this *coincidence* is indeed most remarkable and surprising. It shows that the Creator reserved the exposure of His Heavenly calendar for the day when the planet

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\* Buckland's Bridgewater Treatise. Wight's "Mosaic Creation." Gray's "Earth's Antiquity;" &c.

which, by His own laws was *to rule the night*, had acquired by those same laws the position which first enabled it to *display its domination*. From this wonderful correspondence and coincidence of the day of creation in which the Sun and Moon were first exhibited as “ruling the day and the night,”—with the day of the *lunar revolution* in which, by the laws of creation, the Moon is first able to acquire its *ruling character* in the Heavens, we derive a very extraordinary and unlooked for confirmation of the soundness of our interpretation; and, from hence, we may logically and philosophically further infer, that when God first *illuminated* the solar atmosphere by His word, therein giving *origin to time*, the two presiding luminaries were in that particular relation to the Earth which astronomy calls *inferior conjunction*; and that in the third diurnal revolution of the Earth, they first acquired by their separation, that relative aspect which qualified them to be manifested together as the two great *indices* of *annual* and *menstrual* time; but for which manifestation, *both* would not have been prepared on an *earlier day*. And the new Moon being thus in the *third day of its revolution*, (according to our vulgar computation) that is, of its *first quarter*, it would necessarily *appear* at the setting of the Sun, and would thus be ready to *begin, lead on*, and so *rule the night*. The number of the day, therefore, tends to show, that *the first*

*day of creation* was both the *first day* of the *first year*, according to solar computation, and the *first day of the first month*, according to *lunar computation*.\*

From this clear and ingenious exposition of events, we not only derive conclusive evidence that the ancient Mosaical days of creation were precisely of the same duration as these of our present computation, but also that as the Moon became apparent on our third day, as it does still continue to do, the Heavenly bodies must have been brought into relation with our planet as "*light bearers*," on the first day, when God commanded the existence of light; and therefore that they were the sources of that light.

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\* Penn's Comparative Estimate.

## CHAPTER XII.

CREATION OF THE FEATHERED AND AQUATIC TRIBES ; CREATION  
OF MAMMALIA AND OTHER TERRESTRIAL CLASSES OF ANIMALS.

THE production of vegetation, and the appointment of the Heavenly bodies to serve for signs and for seasons, having now rendered the Earth a fitting residence for that animal life which it was part of the Almighty's design to create, we are told that on the fifth day the finny and winged tribes were called forth. These were of course created in such numbers and in such places as the Creative wisdom foresaw would be most conducive to the welfare of the whole. Each was required to perform an especial part in the great chain of animated nature, and each was accordingly placed at once in those climates and in those localities which would enable it to commence upon its allotted duties. The warm and genial climates of the yet untroubled world were stocked "*abundantly*" with every species of marine and winged animal, which was calculated to live and thrive in this first period of terrestrial time. Each was created perfect and mature in structure, whether in the seas or air, endowed with the power of perpetuating its race through the course of many ages, and each and all at once in

obedience to the voice of a Divine intelligence entered upon the duties which His wisdom had severally assigned to them.

“ And God said, Let the Earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the Earth after his kind: and it was so. And God made the beast of the Earth after his kind, and cattle after their kind, and every thing that creepeth upon the Earth after his kind: And God saw that it was good.”

An effect of power similar to that which had already on the third and fifth days clothed the Earth with a luxuriant and abundant vegetation, and produced the aquatic and feathered tribes, now on this sixth and last period called forth and completed the remainder of the animal creation. Thus, no sooner were the several mandates given, than the waters, air, and Earth all teemed with living myriads, each species according to its economy being at once placed or produced in that region which had previously been prepared for its reception, and in which it was destined to perform those duties for which the Almighty had seen proper to create it. Here was no gradual increase from a single pair, no slow and uncertain diffusion from a central focus, but each class, order, and species was at once created in such numbers, as would most conduce to the general welfare and the end in view; and each and all at once entered with vigour and alacrity upon their allotted duties.

## CHAPTER XIII.

INQUIRY INTO THE MODE OF CREATION ; WHETHER BY NATURAL LAW, OR THROUGH THE IMMEDIATE AGENCY OF GOD ; MAN NOT CREATED BY NATURAL LAW ; THE PRESENT LAWS ARE NOT CREATING LAWS ; ORGANIC STRUCTURES PRODUCED—BY THE IMMEDIATE AGENCY OF OMNIPOTENCE.

MUCH offence appears to have been given by a work entitled “Vestiges of the Natural History of Creation,” in which the organic and inorganic worlds are conjectured to have been produced by the agency of certain natural laws.

On this subject it is not unworthy of remark, that between the mandates for the creation of the vegetable and animal kingdoms, and that referring to the creation of man, there appears to be a wide difference,—and one that at first sight might almost seem, in regard to the two former, to sanction a belief that they too, like inorganic structures, have been the results of the agency of some natural law. For instance, the mandate for the Earth to “bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself upon the Earth,” seems to be no more than a command that the laws which the Almighty had imposed upon *all*



*matter*, should now so operate upon that matter as to beget, as it were, a vegetation bearing within itself the power or property of thenceforward perpetuating its various species by the mode of generation. So again, the mandate "Let the waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the Earth in the open firmament of Heaven;" and "Let the Earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of the Earth after his kind." In these instances, the terms of the mandate seem to be precisely the same as those which were previously applied to the creation of light and of the firmament, both of which we have seen to be the positive results of a natural law; the mandate, in short, seems to be a positive command for the laws of Nature to operate and effect the desired ends, rather than a supernatural intervention of the Creative power; for it is not said that God created fish and fowls and placed them in the waters and the air, nor that He created the beasts of the Earth and placed them in various regions upon its surface,—but, that He willed that "*the Earth*" itself should bring forth vegetation and terrestrial animals; and that "*the waters*" should bring forth fish; it being at the same time perfectly evident that neither the waters nor the Earth could have brought forth living creatures, unless some law had

already been imposed upon them to enable them to do so. There is not a single operation recorded in the Scripture, but what is said to have been occasioned by the command of God; and this is very properly so stated; for, since none of the wonderful works therein recorded could have come to pass in opposition to His will, or without His knowledge, it is evident that all must have been performed under His express sanction; but it does not therefore appear to be necessary that we should believe that God actually spoke in the human words attributed to Him,—such being used merely for the sake of impressing more emphatically upon us, that nothing has been done without the express sanction of the Creator; and this line of reasoning seems to be the more probable when we reflect that, after every operation, we are told that “*God saw that it was good.*” Now these very words would seem to imply that God commanded or permitted His laws to operate and produce certain effects under His own immediate guidance and supervision; and, therefore, He saw that the operation was good or properly conducted; thus, in fact, exhibiting that Providence which He exercises over all His works. In taking this view, however, it cannot for an instant be admitted that natural laws *created* either organic or inorganic matter, but only that they operated under the guidance of the Great First Cause Himself, to

produce certain definite forms and beings out of the materials which He had already expressly provided for such purposes; for although we know that natural laws now *regulate* created things, that is no proof that such laws *created* them; while on the contrary, since both the laws and the matter which they govern must equally have sprung from a Creator, it is plain that their operations are but the expressions of His will. But, since the law can only exist so long as its Creator wills that it shall do so, it is evident that "*per se*," that is, as an independent power, it is absolutely "*nil*;" consequently, the law being simply the expression of the will of God, is, in other words, God Himself. Now, organic beings were formed out of inorganic matter, and that matter was *created* "in the beginning," by the fiat of Omnipotence, and became thenceforward subject to those laws which the Creator saw fit to impose upon it for the fulfilment of the ends He had in view. No other matter was provided out of which organic structures were created,—but they were produced out of that which *already existed*, and had long existed under the operation of the laws of Nature! Where then is the reasonableness of denying the probability that organic structures derived their origin not only out of the matter which God had created, but through the agency likewise of those laws to which such matter had been rendered sub-

ject? There is clearly nothing in such a doctrine that can detract in the least degree from the power and agency of the Almighty, for it is distinctly declared and insisted upon, that He is the sole Creator of that matter which enters into the composition of the universe and of its inhabitants; and that the laws by which He regulates that matter, and which He likewise framed, cannot act independently of Him, but are, on the contrary, the direct and manifest expressions of His will.

With regard, however, to the human race, the case seems wholly different, for the mandate is not here given to the Earth, or to the waters, to bring forth man, as in the former instances,—but the Almighty is represented as saying, “Let Us make man in our image.” “And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul.” In this proceeding we trace the operation of no natural law whatever,—but, on the other hand, we perceive the direct intervention of the Creative power, for He Himself formed man in His own image,—that is, in purity of mind, and breathed into his nostrils the breath of immortal life,—a gift which no natural law could ever have bestowed, for such law was appointed to govern materiality, and has no control or power over the immaterial spirit, which still continues to live on, even after the body in which it resided

is again resolved into that matter out of which it was originally formed. Yet after all, the point seems scarcely worth disputing, for we must necessarily admit that whether the inferior orders were created by the immediate fiat of Omnipotence or through the agency of natural causes, the glory of such creation must ever be attributed to Him alone, for the law of Nature being but the expression of His will, the effects of that law are, in truth, the acts of Nature's God. At the same time it should be borne in mind by those who have been accustomed to consider the operations of each Scriptural day, as proceeding from a miraculous fiat, that the Creator never resorts to supernatural or miraculous agencies, so long as His will can be accomplished through those laws which He has imposed upon matter,—and that the very creation of those laws was as much a miracle as any other portion of His works.

Granting, however, that organic structures, like the inorganic, have originated through the agency of natural law, we are still as far as ever from knowing what was the nature of the law, or in what manner it operated. In respect to the inorganic matter of our system, we are enabled to perceive both the nature of the agents by which it has become arranged, and the mode in which they acted; but such, with regard to the first formation of living beings, is not the case, for, admitting that

they too originated through some law acting upon matter, we can as yet perceive neither the nature of the law, nor its mode of acting; and, consequently, we are not advanced one step in the inquiry beyond those who rest content with the assurance that such beings were created without the intervention of a law. In the one case we not only assert that the arrangement of inorganic matter was the result of natural agents imposed "*ab initio*" by the Creator at the moment when He gave origin to that matter, but we are able likewise to see clearly the nature and working of such agents; while, on the other hand, we rest solely upon hypothesis, and therefore the utmost conclusion we can arrive at, is, that, by *possibility*, the organic classes may likewise have received vitality through a similar agency,—a conclusion which no man in his senses can deny, for it must necessarily be admitted that the power which could create at all, could have proceeded by whatever mode appeared to Him the most desirable. Since therefore we can perceive no law by which such a result could have been brought about, we must rest content, until favoured with an increase of knowledge on the subject, with the conviction that by whatever mode they were produced, they were created in accordance with the will of Him who fashioned and upholds the universe. In declaring that a fluid body was created, containing in solution and sus-

pension the mineral atoms of our planet, and that the laws of gravitation and rotatory movement caused such matter to collect at the centre of the mass, we attribute to those laws no more than the effects which they are still capable of producing; but it is at once apparent that such laws did not *create* the matter on which they acted, and do act. The creation of the mass therefore, or that of its previous condition, if it had one, proceeded from the direct will or fiat of Omnipotence, Who then, at the same moment, imposed upon it those natural laws which He had appointed to reduce the mass to order, and which laws still continue to govern it. It may be said that if such were the case with inorganic matter, it would be far more reasonable to suppose that organic beings were likewise created by the immediate agency of God, and then rendered subject to the laws which were appointed thenceforward to govern them; for, if it were true that natural law furnished the infant world by the mode of creation, why does not that law still continue so to work? For we are accustomed to declare that the laws of Nature have undergone no alteration, but have continued unchanged from the beginning,—and yet, if the creation of organic beings proceeded from the operation of natural laws, those laws must have been long since abolished, since we find that the rule now in force does not proceed by the mode of creation, but by that

of generation or reproduction. The laws which produced evaporation and gave origin to atmospheric air, and daylight are still in force, and continue to renew and sustain their work, by the very same mode of operation; the laws, which on the second day, by expanding the saturated atmosphere, gave origin to the firmament, are still preserving it by the same means; the laws, which on the third day, gave origin to the dry land, are likewise still in force. Why then, since the laws which govern inorganic matter are the same as they were in the beginning, do they not now produce organic structures by their ancient mode?

Such an objection as this would assuredly be founded on error, since the law of *creation* and the law of *reproduction* are clearly, totally distinct; the former can only be resorted to in order to give origin to a species that has not hitherto existed; but having given that origin, it makes over the created thing to other laws, which preserve and reproduce or multiply it. Therefore, although it must be admitted that organic beings are now produced by the mode of generation, yet such a procedure by no means proves the *removal* of the original law,—because the law now in force applies only to the production or multiplication of species *created* by another law *which does still exist*, and, as the strata of the Earth can testify, has been resorted to many times since the days recorded in



Genesis. Were any new and extensive tract of land to be now elevated with a climate differing from that of any presently existing region, and for which the constitutions of the present living races were unadapted, it would be necessary likewise to *create* new organic structures to inhabit it; and, in such case, the old law of creation, whatever it may be, would be again resorted to, although thenceforward the races would be perpetuated by the mode of generation. The law of *creation* is not therefore *removed*; but it is, at all times, imperceptible to us, and is only resorted to when *more first formations* or new animals are required; and it does not, moreover, produce organic beings which require to be renewed or multiplied by the mode of creation, but by the mode of generation, and is itself solely restricted to giving *origin* to such beings. But, although we may be at liberty to infer the existence of such a law, we shall, in all probability, remain for ever in ignorance of its mode of operation, for “in no palætiological science has man been able to arrive at a beginning which is homogeneous with the known course of events. We can, in such sciences, often go very far back,—determine many of the remote circumstances of the past series of events, ascend to a point which seems to be near their origin, and limit the hypothesis respecting the origin itself,—but philosophers have never demonstrated, and, as far as we can judge,

probably never will be able to demonstrate, what was the primitive state of things from which the progressive course of the world took its first departure. In all these paths of research, when we travel far backwards, the aspect of the earlier portions becomes very different from that of the advanced part on which we now stand; but, in all cases, the path is lost in obscurity as it is traced backwards to its starting point; it becomes not only invisible, but unimaginable; it is not only an interruption, but an abyss which interposes itself between us, and any intelligible beginning of things.”\*

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\* Whewell's ‘Philosophy of the Inductive Sciences.’

## CHAPTER XIV.

ANIMALS HAVE NOT SPRUNG FROM A SINGLE PAIR OF EACH SPECIES ; THEORY OF PROGRESSIVE CREATION OF SPECIES INCONSISTENT WITH THE DOCTRINES OF THE SCRIPTURES ; CENTRES OR FOCI OF CREATION REFUTED ; SPECIES NOT CAUSED BY MODIFICATION BY CHANGE OF FOOD OR CLIMATE, BUT HAVE A REAL EXISTENCE IN NATURE.

It has long been a matter of doubt and contention whether the days of the creative week, as recorded in Genesis, are to be considered merely of the same duration as these of our present computation, or as indefinite periods of years. It has also been imagined that, like the human race, the plants and animals of every region, have sprung from a single pair of each species, and that in the course of years they have gradually diffused themselves over the countries of the Earth from common *foci* or centres of creation. It will be necessary, therefore, in order to arrive at a clear comprehension of the views contended for in the present inquiry, to ascertain how far these various and conflicting opinions can be supported by facts, or whether, on the other hand, they cannot rather be shown to be altogether untenable.

First then, with regard to the doctrine that all animals have proceeded from a single pair of

each kind, there would appear to be no better ground for such a belief than that of the fact that mankind is said to have so descended; for, with respect to the actual numbers of the animal and vegetable races, the Record is altogether silent. If, however, we take the Mosaic account in the literal sense, and believe them all to have been created on the third, fifth and sixth days, as stated in Genesis; that those days were natural days of twenty-four hours' duration, and that the habits and propensities of species were then the same as now,—it becomes quite evident that many would never have multiplied at all, for the reason that birds of the raptorial and insectivorous orders, as well as the carnivorous mammalia and predaceous insects, would have destroyed them in the very outset of their career, for it must be easy to perceive that the loss of either a male or a female at this early stage would at once have crushed the species. This view, therefore, is decidedly erroneous.

Secondly, if we suppose that each department of organic Nature had a separate period of undefined duration allotted for its production; and if the creation and diffusion of the species of each department were progressive through that allotted period, each being called into existence only when its services were required, we shall first have the vegetable kingdom diffusing itself gradually over

the Earth through a number of years, until some plants would have become so numerous as to annihilate many of the feebler species; and so would it have been in all the other departments.

Thus it would seem that if creation occupied only six natural days, and each of these produced its peculiar events, a single pair or even several pairs of each species would have been quite inadequate to stock the Earth, because the predaceous tribes would have destroyed the weaker to satisfy the cravings of their appetites; while, in like manner, the herbivorous animals would have speedily destroyed the vegetation. Or again, if, on the other hand, we admit that the six days of Scripture were so many undefined periods of years, and, according to the Record, one period produced vegetation, another birds and aquatic animals, and a third mammalia and other terrestrial creatures, we shall still overthrow the very doctrine we wish to establish, because the lapse of years, between the creation of the vegetable and animal kingdoms, would have been so great, that the former being empowered to increase and multiply without a check to preserve a due equilibrium of species, would, in the warm and probably humid climates of the infant world, have choked and destroyed each other; so that by the time a check had been furnished by the creation of some animate beings, many of the original and more tender plants would have become extinct;

for the vegetable kingdom would not only have been rapidly increasing and diffusing itself over the Earth without the least restraint, throughout its own indefinite and peculiar period of years, but also through the *fourth* and *fifth* periods, with the exception of the slight check some species might have received during the latter period from birds; but not until the *sixth* and last period (when man himself was created, and by which time the Earth would have become a perfect wilderness,) would the vegetable world have been restrained by the ravages of mammalia, insects, and all the other terrestrial classes. It is evident also that if such had been the order of creation, those members of the feathered tribe whose food consists of insects alone, could not have had existence at all, for while they are said to have been created on the *fifth day*, the insects which constitute their food were not created until the *succeeding period of years* or sixth day; so that, supposing each day was an indefinite period of thousands of years, we shall perceive that if any insectivorous species of birds were then in existence, we are reduced to the necessity of believing that they must have been constituted *to endure the pangs of hunger and to live without food for thousands of years!*

“All the plants of a given country,”—says De Candolle,—“are at war one with another; the first which establish themselves by chance in a particu-

lar spot, tend, by the mere occupancy of space, to exclude other species, the greater choke the smaller; the longest livers replace those which last for a shorter period; the more prolific gradually make themselves masters of the ground, which species multiplying more slowly would otherwise fill." "Every plant," observes Wilcke, "has its proper insect allotted to it to curb its luxuriancy, and to prevent it from multiplying to the exclusion of others. Thus grass, in meadows, sometimes flourishes so as to exclude all other plants; here the *phalæna graminis*, with her numerous progeny, find a well spread table; they multiply in immense numbers, and the farmer for some years laments the failure of his hay crops; but the grass being consumed, the moths die of hunger or remove to another place. Now, the quantity of grass being greatly diminished, the other plants which were before choked by it, spring up, and the ground becomes variegated with a multitude of different species of flowers. Had not Nature given a commission to this minister for that purpose, the grass would destroy a great number of species of vegetables of which the equilibrium is now kept up."\* From these facts it may easily be seen that if the plants were diffusing themselves for thousands of years over the Earth before the creation of the

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\* Lyell's 'Principles of Geology,' Vol. II., p. 131.

insect tribes, as the theory above alluded to requires, many of them would shortly have been exterminated, and the Earth abandoned to those of hardier and ranker growth. Thus we are forced to acknowledge the importance of the insect tribes in keeping in check those plants which would otherwise soon cause the extinction of the weaker and less enduring species; and we are still further induced, unhesitatingly, to reject the doctrine which would teach us, that the days of the creative week may be construed into indefinite periods of thousands of years.

It was suggested by Linnæus that the portion of the Earth which was first destined to be the abode of man, probably contained climates suited to all classes of beings, vegetables as well as animals; and that from this nursery or focus, a gradual diffusion was effected. The various degrees of temperature were produced by supposing the region to possess some lofty mountain ranges on which, at various elevations, were to be found the plants and animals destined for cool climates. Now this region must necessarily have contained *all* the plants and animals of the world, as it was then constituted; some of these being fitted for a residence in hot climates, could not live in a cold one; others destined to inhabit cold regions, could not survive in tropical temperatures. From this focus the various genera and species



were to multiply and spread themselves. Various objections might be urged against this hypothesis; and first it may be asked,—were those mountains *isolated*, or were they connected by other chains or ranges with various regions of the Earth? Isolated, they clearly could not have been, for in such case the animals and plants which delighted in cold climates must have remained merely local and without the power of dispersing their species over other parts; for, being unsuited, by reason of their constitution and habits, to undergo the heats of the plains below, and the proper food of the animated classes often failing them, they would undoubtedly have perished in attempting to find other countries adapted to them. Thus, for instance, the Himalayan wild sheep\* and ibex,† and various other animals peculiar to the higher and colder regions of the mountains they inhabit, cannot live in the scorching plains of India, and degenerate and die even on the lower ranges. Again, the monaul,‡ the golden-breasted tragopan,§ and others of the feathered tribes, whose natures fit them for a residence in a cold climate, would all have perished in seeking new countries adapted to their wants and constitutions. How then, if such

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\* *Ovis Burrell* (Blyth) and *O. Nahuor* (Hodgson.)

† *Capra Sakeen* (Blyth.)

‡ *Lophophorus Impeyanus*.

§ *Tragopan Hastingsii*.

species then had existence, could they have spread from any isolated focus?

It might not, perhaps, be very difficult to prove that in the primitive epoch here spoken of, no animals or plants of a cold climate or snowy region were then in being. Such an argument, indeed, would find ample support from the fossil phenomena of the stratified formations, the whole of which can only be referred to a climate analogous to that of the tropics of the present time.

If then the plants and animals of that golden era in the history of our planet are found to be such as reasoning from analogy, could only have flourished beneath the smile of warm and sunny skies, we are naturally led to conclude that the climates and their productions were mutually adapted to each other; and consequently, that the primeval condition of the temperature of the Earth's climates was wholly that of a tropical character. If such reasoning be just, and the fossil phenomena of our strata are allowed to furnish data by which we may satisfactorily determine this point, then can we have no hesitation in declaring that the climates of the Earth being wholly tropical, no animals or plants peculiar to the colder regions were then in existence. Such reasoning, while it is strictly in accordance both with geological observations and the narrative of Scripture, will show likewise that no snow-clad mountain station

in the primitive focus was at all necessary, since there were neither animals nor plants adapted to such situations.

From Lyell's Principles of Geology we also derive an apt illustration of the absurdity of supposing that the vegetable and animal kingdoms were originally diffused from a common centre. In speaking of the supposed *foci* of creation, he says, "let us imagine that about three centuries before the discovery of St. Helena (itself of submarine volcanic origin) a multitude of new isles had been thrown up in the surrounding sea, and that these had each become clothed with plants emigrating from St. Helena, in the same manner as the wild plants of Campania have diffused themselves over Monte Nuovo. Whenever the first botanist investigated the new Archipelago, he would meet with individuals of every species belonging to all parts of the Archipelago, and some in addition peculiar to itself, namely, those which had not been able to obtain a passage into any one of the surrounding new formed lands. In this case it might be truly said that the original isle was the primitive focus or centre of a certain type of vegetation; whereas, in the surrounding isles there would be a smaller number, yet all belonging to the same group."\* If we apply this reasoning to the supposed primitive

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\* Lyell's Principles of Geology.

focus from which all organic Nature is often erroneously supposed to have been diffused, it will follow that the productions of its various climates should not only be expected to occur partially in surrounding and similar temperatures, but that *species of every kind* should be found *in one particular country of that region* from whence each originally sprung; while, at the same time, it would probably contain some that were peculiar to itself, namely, “*those which had not been able to obtain a passage into any one of the surrounding*” countries. Yet this is not found to be the case, for, although widely separated regions may produce some apparently similar climates, still few of the organic productions are the same.

In the mountainous tracts of tropical countries whose climates are modified by various degrees of elevation, animals may be found which are common also to some of the cooler and temperate lowland countries of other regions; but by far the greater proportion of their products, both vegetable and animal, are quite distinct. Besides this, many species and some genera are decidedly local and only to be met with in one peculiar region. Thus, while the toucans (*ramphastos*) inhabit South America, the hornbills (*buceros*) are confined to Eastern Asia; while the jaguar (*felis onça*) and puma (*f. concolor*) are peculiar to the new, the lions and tigers are peculiar to the old world; the

kangaroo and ornithorhynchus of New Holland, the birds of Paradise, and the now extinct dodo, are only a few among many instances of this predilection for peculiar and widely separated climates. Thus, too, does D'Aubuisson truly remark, that of organic beings, "some can only live in the bosom of *the sea* ; others in *fresh waters* ; some are only to be found within the *torrid zone* ; while there are others which would perish the moment they should be removed from the *frigid zone* ; in a word, *each species* appears as if it were fixed to *an element or climate proper and peculiar to it.*"\* It might perhaps be more truly remarked, that *apparently* similar climates seem, in most cases, to produce a strong similarity rather than an absolute identity of species, although doubtless there are a few which may be common to several climates. Thus, in the lofty ranges of the Himalaya, some climates may be found, at least if we may judge of climates by their products, approaching to those of the lowland tracts of Europe. Here ranging through the hills, from an elevation of 2,000 feet, to that of 12 and 13,000 feet above the sea, are found in numbers "*the brimstone*"† and "*swallow-tailed*"‡ butterflies, identical with those of Europe ; and in company with them may

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\* D'Aubuisson *Traité de Geognosie*, Tom I. p. 8.

† *Goniapterix Rhamnii*.

‡ *Papilio Machaon*.

be also seen "*the white cabbage*"\* butterfly, as well as "*the painted lady*;"† this last named species being likewise found at Candahar in company with "*mancipium daplidice*." These species are all truly identical with those of Europe, and doubtless there are many more besides, yet still this does not, in any way, prove that the climates in which they occur are identical with those of Europe, but only that *these species are so constituted* as to be able to live and thrive in various temperatures; for if the climates were actually the same, then might we seek in Europe for the many species which are now peculiar to the Himalayas. In this latter region, however, we not only find at various elevations, forms proper to European climates, but likewise others which are inhabitants of the hot lowland provinces of India, of China, and of the southern tracts of Afghanistan in Central Asia. Yet, as each of these regions possesses many species which appear to be strictly peculiar to itself, it becomes evident, notwithstanding this intermixture of their products, that their climates are still decidedly distinct. The animals *common to Europe* and certain localities in Asia, are therefore few in comparison of those which are peculiar to either; and thus, although at first the identity of some species and the strong similarity

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\* *Pieris Brassicæ*.

† *Cynthia cardui*.

of others, might tempt one to agree with some writers, that species have no real existence in Nature, but have descended from a common source and become modified by climate; yet the absolute distinctness of others peculiar only to certain regions and often to very limited and particular localities in those regions, must at once upset such a theory; for it is evident that such alleged modifications must have been the work of ages,—that is, since the first creation of the species from which they are descended; and, therefore, on the first extension or migration of the original stock into other climates than that of its focus, that it remained “*in statu quo*” for a few years; and afterwards, as the difference of climate told upon its constitution, it gradually assumed different colours or modifications of its original colours. But as we find from the difference of their general products that the climates of Europe, of the Himalaya, and of the Indian lowland provinces *are distinct*, how comes it that the species of lepidoptera above enumerated, namely, “the *brimstone*” and “*swallow-tailed*” butterflies, have lived for ages in the two former dissimilar climates *without having undergone any change or modification?* Or, how again is it, that we find in the three regions just mentioned,—that is, in Europe, in the Himalayas, and at Neemuch in the western provinces of India, species which are common to them all,—namely,

“*the painted lady and death’s head hawk moth?*” or how is it that the “oleander hawk moth,” (*metopsilus nerii*) found in the latter, is identical with that of the former region?

In the case of man, or of the higher animal classes in general, it might be said that change of food together with that of climate, has been instrumental to this modification; though even this is far from being proved to be the case. But to the insect tribes such theory is totally inapplicable, since we know that the larvæ of many species will feed on one plant only, and when that fails them they must perish,—so that climate alone must be the cause of change in them. We see, however, from the examples above given, that climate alone is *not sufficient* to effect this change; and therefore we are forced to conclude that genera and species have not diffused themselves from any central focus, but that they were placed or created in those countries which were best adapted to them. “The natural productions of Japan, in many instances, present the most astonishing similitudes to those of Europe; yet they exhibit characters which cannot be well reconciled with variation, however unimportant in themselves, because they are distinctions which climate or locality are not in the least likely to bring about. Besides, supposing the latter, we should not only expect to meet with specimens in every degree



intermediate, but to find the same species equally flexible to circumstances in other places, which is not the case.”\*

But there is yet another class of beings to which these remarks may be still more convincingly adapted; namely, the terrestrial and fluviatile mollusca. Species occur apparently in every country, however widely they may be separated from each other; yet, at the same time, many are extremely local even in their respective countries, while others take a wider range and appear indifferent alike to heat and cold. The shells of the Indian lowland provinces, give place in the Himalaya, as the temperature becomes cooler, to forms more nearly resembling those of Europe, some still advancing a short way into the hills, but, as if impatient of the chills of a mountain winter, confining themselves to the valleys of the lower and outer ranges. One species, however, the “*nanina vesicula*” of Benson, appears alike to defy the heats of the provinces and the winter of the mountains, ascending even beyond the height of 10,000 feet above the sea; yet still preserving everywhere the same habits. If climate therefore is instrumental in gradually changing or modifying a species, how is it that “*nanina vesicula*,” so widely distributed through the warm provinces of India, still remains precisely the same

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\* Blyth in Loudon's Mag. Nat. Hist., No. 66, p. 510—1836.

in habits, form and economy, even on a mountain rising nearly to a height of 11,000 feet above the sea and where *snow* lies early in autumn and continues more or less throughout the winter season? or why, since the rigour of a cold climate is known to be instrumental in clothing the animals of warmer regions with a thicker and more woolly covering, has it not altered the habits and economy of these fragile beings, for we find *nanina vesicula* using the same thin viscid operculum and in every respect preserving the same habits on Whar-too mountain, as it does in the hot plains of the Gangetic provinces; while two other species\* discovered among juniper bushes at the Boorenda pass, at a height of about 13,000 feet, and deeply buried in snow during the winter months, make use of the same means to secure the aperture of their shells, as their congeners which inhabit the lower and warmer ranges near Simla? It is obviously because a merciful Creator originally endowed these species with constitutions adapted to set the effects of climate at defiance, and to preserve themselves distinct and free from change or modification, alike among the snows of a mountain winter, or the parching heats of a tropical summer.

But again, if we wander with these several species from the original focus of creation, how shall we

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\* "*Nanina monticola*" et "*bulimus ornatus*."—(Hutton.)

cross the many streams and rapid rivers, to say nothing of the sea, which intersect and divide the countries in which they are found? Or how, since rivers and lakes, in different quarters of the globe, are stocked with species peculiar to themselves, could they have wandered to their respective localities? Their distribution evinces too much design to admit for an instant of the idea that their *ova* were diffused through the agency of winds or of aquatic birds, as some speculators have imagined, independent of the fact that there is no one region or focus which contains all the species, and that the suddenness of such a transportation or diffusion would have tended rather to *exterminate* than to *disseminate* the species! Nor could they have wandered from a common centre in the sea, for they are adapted solely for a residence on the land or in *fresh waters*, and would perish instantly in *salt waters*.

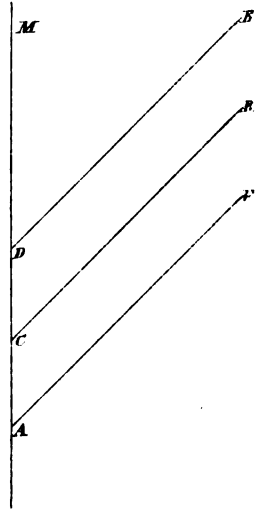
These various speculations then must be abandoned as untenable, and the only rational conclusion must be that every species was created for certain purposes and for certain climates, and adapted at once to those situations in which they were to perform their allotted duties; and, being so adapted, they were placed or created each and all *in such numbers and in such proportions* as an infinitely wise Creator saw good, *in the several situations and countries where their services were alone required*.

## CHAPTER XV.

THEORY OF THE TRANSMUTATION OF SPECIES, CONSIDERED;  
 SHOWN TO BE OPPOSED TO NATURAL AND EXISTING LAWS,  
 AND THEREFORE CONTRARY TO FACT; MAN, NOT SPRUNG  
 FROM THE LOWER CLASSES OF ANIMALS, BUT AN ESPECIAL  
 CREATION BY OMNIPOTENCE.

In the work already alluded to, entitled "Vestiges of the Natural History of Creation," we are told, with reference to the author's doctrine, of the transmutation of species from the lowest to the highest types of organization, "that in the reproduction of the higher animals the new being passes through stages in which it is successively fish-like and reptile-like. But the resemblance is not to the adult fish or the adult reptile, but to the fish and reptile at a certain point in their fœtal progress; this holds true with regard to the vascular, nervous and other systems alike. It seems as if gestation consisted of two distinct and independent stages,—one devoted to the development of the new being through the conditions of the inferior types, or rather, through the corresponding *first stages of their development*; another perfecting and bringing the new being to a healthy maturity, on the basis of the

point of development reached. This may be illustrated by a simple diagram. The fœtus of all the four classes may be supposed to advance in an identical condition to the point A. The fish there diverges and passes along a line apart, and peculiar to itself, to its mature state at F. The reptile, bird and mammal go on together to C, where the reptile diverges in like manner, and advances by itself to R. The bird diverges at D, and goes on to B. The mammal then goes forward in a straight line to the highest point of organization at M.



This diagram shows only the main ramifications, but the reader must suppose minor ones representing the subordinate differences of orders, families, genera, &c., if he wishes to extend his views to the whole varieties of being in the animal kingdom. Limiting ourselves at present to the outline afforded by the diagram, it is apparent that the only thing required for an advance from one type to another in the generative process is, that, for example, the fish embryo should not diverge at A, but go on to C, before it diverges, in which case the progeny will be,

not a fish but a reptile. To protract *the straight-forward part of the gestation over a small space* is all that is necessary.”\*

Now, supposing that such law exists, and has been in operation, as our author imagines, through countless ages, ought we, according to his views, to find any or so many of the lower types now in existence? Ought they not rather to have vanished from the Earth and become changed into those of a higher grade in the scale of organization? It may be answered that sufficient time has not yet elapsed to enable all the lower types to become transmuted into the higher, but that such a time will eventually arrive. If such be the case, a time must one day come when none but the human race will inhabit the Earth; for, according to the theory under consideration, the lower types of animal life will be gradually changed into that of the highest type. Judging from the diagram here given in support of the argument, such a result would appear to be inevitable, for we are told that the foetus of all the four classes may be supposed to advance in an identical condition to the point A. The fish then diverges and passes along a line apart and peculiar to itself to its mature state at F; and that the only thing required to advance this fish to a higher type in the generative process

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\* Vestiges of the Natural History of Creation, p. 219.

is that its embryo *shall not diverge* at A, but go on to C, before it diverges, in which case the progeny will be, not a fish, *but a reptile*. Now if the *law of Nature* is, that the fish shall become a reptile, and the reptile a bird,—it must be evident that there can be *no other law to prevent* such transmutation; and, consequently, that the result of the continued operation of such law is unavoidable, namely, that in the course of ages the fish *must* become a reptile,—the reptile *must* become a bird, and that again, a mammifer, until each and all eventually terminate in man! The result is unavoidable, simply because the God of Nature does not frame one set of laws for the accomplishment of certain ends, and another set to prevent the fulfilment of His wishes; therefore, if there be truly *a law* by which the lower types of animals are to be gradually transmuted into those of a higher grade, a time must inevitably come,—if indeed it ought not already to have arrived,—in which they will all have passed through the intervening stages up to the highest point of promotion! What then will be the condition of the planet? That man will be the sole inhabitant of a desert waste,—without a blade of grass, a shrub or tree on which to rest his weary eyes,—for the law of Nature compelling transmutation must affect the vegetable, equally with the animal kingdom; and thus the lowest types will be changed

into the higher until all will result in man, or until in short the vegetable and animal kingdoms are absorbed and man is left to prey upon his species or to starve! The utter fallacy of such a theory is thus at once apparent, not only from its results, but from its being placed in direct opposition to that other law which has provided all created beings for *the use and benefit* of mankind. Is it then, in any way, reconcilable with reason to suppose that the operation of one law, must end *in depriving* him of those creature comforts, *to supply which* another law was framed? or dare we venture to suppose that the Almighty would create the vegetable and animal classes for the express purpose, as His word informs us, of contributing to the comfort and wellbeing of mankind, and yet that He would, at the same time, act so inconsistently as to nullify the gift, by the imposition of a law which should in time deprive him of them, and reduce him to die of want? Yet such would appear to be the consequence of the mode suggested by the eloquent and eccentric author of the "Vestiges."

Again, it does not appear to be very clear why the embryo of each class should eventually become a fish, a reptile, bird, and mammal; all are said to be apparently the same up to a certain point, when first the fish, then the reptile, then the bird undergoes a change and



assumes a different form of being. If all are originally *identical*, by what means does one embryo become a fish and another a reptile? If *identical* in the *embryo state*,—*identical* they must remain in the *adult state*! Why, since all are the same up to a certain stage of development, do they not *all* become fish, or reptile, or mammals? Some law, some reason, there must be for this division into various classes and genera; accidental it *cannot* be, for there can be no chance or accident in a system, every part of which is under the guidance and direction of a law! And yet if the embryo fish can, under some circumstances, become a reptile, it must be evident that there can be no true law, for that being ordained to a certain end, must of necessity produce that end. If the fish embryo, under peculiar circumstances, can become a reptile, the law which ordained that it should otherwise become a perfect fish, is set aside or evaded; and if, again, it is the law of Nature that the fish embryo shall produce a reptile, it is evident that such law must be obeyed and all fish must become reptiles. If, however, the change is only produced under certain favorable circumstances, we are led to believe it to be one of *chance* and not of *law*; and, instead of the supposed transmutation being, as the hypothesis would require, one of *rule*, it becomes altogether the *exception*!

There is,—there can be,—but one reason why the embryos of the four classes alluded to, should diverge at the points indicated in the diagram, and that is simply because the embryo of every class, however similar in *appearance*, through the earlier stages, is positively and unalterably *distinct*; each animal has a particular duty allotted to it which no other can perform, and thus from the beginning to the end of its existence, it is preserved distinct and free from change, agreeably to the terms of that original mandate, which decreed that the waters and the Earth should each, respectively, bring forth the moving creature that hath life, *each after his kind*,—“the herb yielding seed and the fruit tree yielding fruit *after his kind*,”—that each species might be perpetuated upon the Earth. Could it be truly established that none but the lowest types of organized beings had originally stocked the Earth, and that these progressed *uncertainly as favorable circumstances offered*, to the higher grades, where would be the wisdom or the truth of that Revelation which teaches us, that the Earth, the waters and the air, were each, respectively, stocked with classes, genera and species peculiar and proper to themselves? The Record leaves us no choice,—no room for speculation in this matter,—but positively asserts that organic beings were created “*each after his kind*,” that is, *after his species*, and endowed with the

power of perpetuating his race through succeeding ages. There appears, moreover, in the doctrine of transmutation, something that is at direct variance with that Almighty and intelligent power which we are accustomed to assign as one of the chief attributes of the Creator. The law, be it remembered, was framed for the express purpose of producing man,—a creature subject to all the cravings of appetite, and sensitive to the changes and vicissitudes of his abode; a creature, in short, whose whole comfort and wellbeing is dependent upon the existence of the inferior organic classes; and yet so defective is that law found to be, that it is totally inadequate to answer the end for which it was established, until it has first gone step by step, *and that with no degree of certainty*, for it is dependent upon “*favorable circumstances*,” through every class of organized Nature, and ends by leaving the creature it has thus long laboured to produce, to die of want! In this system of progressive development we are reminded of the method adopted by man in constructing an edifice; he determines upon building himself a house; but, finding his utmost ingenuity and skill insufficient to effect the immediate consummation of his wishes, he is necessitated to proceed by the slower method of building. For this purpose, he first makes his bricks, procures his lime, and gradually proceeds step by step to

erect his house, until it at length becomes such as he had originally contemplated. So, too, is the natural law made to work. Being unable to effect the desired end at once, it is necessitated to proceed step by step through every class of organic beings, until at length,—according to our author,—an ape gives birth to man! The argument, however, has reference solely to man's *material form*; how or whence he inherited from the ape his immortal spirit, that character which at once marks him as a being distinct from every other member of the organic world, it is not deemed necessary to inform us. But, even granting that the law of transmutation at length gave origin to the human race, *why does not that same law still continue to supply fresh individuals of the species?* such rule, once framed, became thenceforward a *permanent law of Nature, which must still be operating*, unless it was ordained to act only until it had produced the first pair of human beings, and then to cease for ever! In this case the alleged law has acted only on one fish, one reptile, one bird, and one ape of each sex, and then fell into final disuse! Yet, to say that such law has been removed, is to deny the immutability and persistency of Nature's laws. Where then are we to look for the effects of the continued operation of this law of transmutation? The countries of the Earth are not now peopled by the

mode of transmutation through the agency of apes, but by the mode of generation, and as every thing teaches us that the laws of Nature are now such as they have ever been, so we are compelled, by reason and experience, to reject so wild and baseless a theory. In short, the whole system is a fallacy, for not only does it exhibit, in its imaginary laws, the strongest evidence of defect, but it is utterly irreconcilable with that Revelation which teaches us that species were stamped from the beginning with true distinctive characters, and ordained to perpetuate "*their kinds*;" while, again, the scheme seems to be refuted by the fact that every species of mammifer requires in its infant state, a milk diet, and is wholly dependent upon its parent for such nourishment. Now, since our author derives the mammals from the birds, it seems demonstrated clearly that his system could never have advanced beyond this stage; for, as no bird could have *given birth* to a mammal offspring, so neither having done so, could it have supplied the necessary nourishment, from which facts it is evident that none of the latter class could ever have been produced, and thus man would never have existed to pen absurdities.

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## CHAPTER XVI.

PROOFS THAT THE DAYS OF THE CREATIVE WEEK WERE NATURAL DAYS; NO CARNIVORA OR OTHER PREDACEOUS ANIMALS HAD EXISTENCE ON THE LAND DURING THE FIRST EPOCH.

IT follows from what has been already advanced, that two propositions arise for our consideration; namely,—in the first place,—were the days of Scripture as used in Genesis, periods of indefinite duration, as contended for by many modern writers; or, were they not natural days of twenty-four hours, corresponding exactly to the same periods of our present computation? and, secondly, were there carnivorous and other predaceous tribes of land animals included among those which are stated to have been created during the ‘week of miracles?’

In regard to the first question, we have already given a very conclusive answer in the description of the events which took place on the fourth Scriptural day, wherein it has been shown, from the existing laws of Astronomy, that the Moon, by becoming apparent to the Earth on that day, or on the corresponding evening of our third day, distinctly determines the duration of that period

to have been then, as now, of twenty-four hours. There are, likewise, various passages which may be quoted from the Scriptures to show that the period of time intended by the word "*day*" was precisely similar to that which we still so name; for example, it is said in the fifth chapter of Genesis, that "the days of Adam after he had begotten Seth were eight hundred years;" again, "it came to pass after *seven days* that the waters of the flood were upon the Earth;" "and the rain was upon the Earth *forty days and forty nights*;"—"and the waters prevailed upon the Earth an hundred and fifty days." Can it be supposed, with any show of reason, that the days here spoken of were periods of undefined duration, or other than days of twenty-four hours only? It will be urged, perhaps, that the signification of the word is determined in all these passages by the context, namely, that Adam's days are said to form a period of years, and therefore that their duration is clearly limited to twenty-four hours; while the rain being on the Earth "*forty nights*," likewise determines the length of the day. But such reasoning would, in like manner, determine the days of creation to be natural days; since we find that each consists of a period of *light*, and a period of *darkness*, as at present, and that "the evening and the morning" formed then, as now, a day of twenty-four hours'

duration; for if we do not so accept the term, we oblige ourselves to believe that an *indefinite* period of light and an *indefinite* period of darkness, alternately prevailed upon the Earth; and thus, as light is essentially necessary to the life of most organized beings, the world would have become depopulated and waste. The question may be still further answered by what is said in the 22nd verse of the 8th chapter of Genesis, wherein the Almighty declares, after the flood, that “while the Earth remaineth, *seed time and harvest, and cold and heat, and summer and winter, and day and night shall not cease.*” In this verse the actual meaning of the word “*day*” is positively determined by the context, which runs progressively through the different seasons and periods of annual and menstrual time, down to the actual day and night. Again, in the commandments delivered by Moses to the Israelites, it is said,—“Remember the Sabbath day, to keep it holy. Six days shalt thou labour, and do all thy work: but the seventh day is the Sabbath of the Lord thy God: in it thou shalt not do any work, thou, nor thy son, nor thy daughter, thy manservant, nor thy maidservant, nor thy cattle, nor thy stranger, that is within thy gates: for *in six days* the Lord made Heaven and Earth, the Sea, and all that in them is, and rested the *seventh day*: wherefore the Lord blessed the



sabbath day, and hallowed it.”\* In this commandment, the day, as understood by Moses himself, is evidently of twenty-four hours; and he plainly and distinctly tells the Israelites that, *because* God had created all things in *six days*, and had rested from His work on the *seventh day*; that *therefore* they were likewise to do all that they had to do *within the same time*, and were to rest from work, and keep holy the seventh day! He does not tell them that, because *in six indefinite periods of years*, God had created all things, and had rested from His work during a *seventh indefinite period*; that therefore they were enjoined to keep holy *the seventh natural day* in commemoration of the event; but, on the contrary, he makes no distinction whatever between *the day*, as he uses it in describing the events of the creative week, and *the actual day* which he enjoins them to keep holy, and he therefore clearly determines them to be identical.

The argument generally made use of is that the days of creation may be inferred to mean periods of indefinite length, from those passages of Scripture which declare that with the Lord “*a thousand years are as one day.*” The passage, however, really affords no support whatever to the argument as to the actual duration of the Mosaical

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\* Exodus xx., 8 to 11.

day, since it merely declares, what all will readily admit, namely, that the finite periods of *days* and *years* in the sight of an Eternal Being, who was, and will be from everlasting unto everlasting,—whose existence knew no beginning and will know no end,—*must be as nothing* in the scale of time and eternity; that He could as readily perform His works in one day or in one second, as in one year, or in unlimited periods of years; and however vast such periods may seem to our *finite* capacities, which find great difficulty in grasping even a few millions of ages, yet in the sight of the Almighty, all periods must be the same. The passage, therefore, seems to insist upon nothing more than that in the sight of God, days and years are the same, and that although such periods and divisions have been established to suit the convenience, wellbeing and capacity of an infirm and short-sighted creature,—yet there is, in reality, no such thing as a division of time in the presence of the eternal and everliving God.

Secondly,—were there any carnivorous or other predaceous animals previous to the fall of man?

Many facts conspire to render it probable that during the short interval which elapsed between the creation and the fall of man, no *terrestrial* species of predaceous animals of any class had existence; nor need this reasoning, in any way, perplex or surprise us, for it is in strict accordance

with the doctrines of the Bible, as set forth in the 29th and 30th verses of the very first chapter of Genesis, wherein it is clearly stated that to man was allotted for meat, "every herb bearing *seed*, and every tree in the which is the *fruit* of a tree *yielding seed*;"—while to the brute creation it is as distinctly declared that to "*every beast* of the Earth, and to *every fowl* of the air, and to *every thing* that creepeth upon the Earth, *wherein there is life*"—was given "*every green herb for meat*." Here is the line as clearly and as broadly drawn, as the most captious and most scrupulous could require;—there is no mention whatever of carnivora, or animals of prey, even in allusion, but the food allotted to the animal world is solely and exclusively that of the *herbivora*. Between man and the brutes, there is this distinction made, namely, to the one *the grains* and *the fruits* of the Earth, and to the other *its herbs* are given; but between the animal classes no line or distinction whatever is drawn. In this view we are also supported by the testimony to be derived from the fossil flora of the earlier secondary strata, which is precisely of that character which the above opinions would lead us to expect. "The antediluvian vegetation,"—says Sharon Turner,—"*was very different from the present*. This is the statement of the most eminent of the modern geologists; and the phenomena in the fossil matters of the

Earth have suggested and justify the supposition. The difference was of two kinds; it was that of a tropical character implying a temperature like that of the torrid zone or equatorial regions, and displaying that largeness of size which is only now found in regions where that degree of heat prevails; and it was also not of the leguminous species; not the corn plants or the vegetables which now constitute the food of man, but it was of the reedy, fern-like, grassy, more aquatic and puny kinds, such as are adapted for the nutrition of brute animals, and obviously, by its nature, indicating that these were then living or predominating in those regions where the imbedded remains of this character appear.”\*

The Venerable Mr. Kirby appears indeed to think that the carnivorous races were really in existence although restricted to vegetable food, for he says—“if the instinct of the predaceous [animals] was not restrained, they would soon have annihilated the herbivorous ones, even if, as Lightfoot supposes, they were at first created by sevens. They must, therefore, originally have eaten grass or straw like the ox, and neither injured nor destroyed their fellow beasts of a more harmless character; this indeed appears clearly from the terms of the original grant, ‘to every beast

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\* Turner’s Sacred History of the World.

of the Earth, and to every fowl of the air, and to every thing that creepeth upon the Earth, wherein there is life, I have given every green herb for meat.' "\* There is a degree of absurdity in this which is scarcely excusable in so eminent a writer, for had the fact been as he supposes, it must follow that the dentition of the carnivorous animals has been entirely changed since then, and not only their dentition, but their digestive organs and general structure likewise; for there is a very marked and striking difference between the teeth of the carnivora and those of the herbivorous tribes, the one being adapted solely for the grinding or bruising of vegetable substances, and the other for tearing flesh; while the stomach of carnivorous animals is unadapted to the digestion of a strictly vegetable diet. " We are well aware, that hoofed animals must all be herbivorous, since they have no means of seizing prey. It is also evident that, having no other use to make of their fore-legs than to support their body, they do not require a shoulder so vigorously organized as that of carnivorous animals; they have therefore no acromion or clavicle, and their shoulder-blades are narrow. Having also no occasion to turn their fore-arm, their radius is united to the ulna by ossification, or, at least articulated by a ginglimus or hinge-joint,

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\* Bridgewater Treatise—Kirby on Animals, Vol. I. p. 9.

and not by arthrodia or ball and socket, to the humerus. Their food being herbaceous, *will require teeth furnished with flat surfaces for grinding seeds and plants.* The crown of the teeth must also be unequal, and for this purpose must be composed of parts alternately consisting of bone and of enamel. Teeth of this structure necessarily require horizontal motions to enable them to triturate the food; and hence the condyle of the jaw cannot be so strictly confined within its articulating cavity as in the carnivorous animals, but must be flattened, and thus correspond with a more or less flattened surface of the temporal bones. Further, the temporal fossæ, which will only have a small muscle to contain, will be narrower and not so shallow, as that of carnivorous animals.\* “Many of the carnivora have not the power either of masticating or digesting vegetable substances; others can do it partially.”† The digestive apparatus is in all animals modified according to the nature of the food upon which it is destined to act; and, as the varieties of food are almost innumerable, so also this apparatus, though fundamentally the same in every animal, is yet constructed with endless diversity. All the varieties of food, however, may be divided into

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\* Jameson's Cuvier's Theory of the Earth, p. 87.

† Griffith's Cuvier's Animal Kingdom, Vol. II., p. 83.

the two great divisions, vegetable and animal; corresponding to which are the digestive apparatus of herbivorous and carnivorous animals, in which two classes the whole animal creation may for our present purpose be considered as included. Vegetable food, differing far more widely in its nature from the constituent parts of the animal frame, than animal food of any kind, is neither so easily assimilated, or in other words, converted into the substance of the body, nor does it contain so large a proportion of nutritive particles; and hence the construction of the digestive apparatus of herbivorous animals is more complicated, and upon a larger scale, than that of the carnivora. Many of the herbivora have four and some even five stomachs, and their alimentary duct is upwards of twenty times the length of their body. The first three cavities which are lined with the same covering as the mouth and gullet, appear to subject the food to certain preliminary processes necessary for rendering it capable of animalization in the true stomach; and it is worthy of remark, in confirmation of this, that in young animals which are still suckled, the paunch is of a very inconsiderable size; and the milk, which is a simple animal product and easily assimilated, appears to pass direct into the fourth stomach, the sides of the third cavity adhering closely together. Thus, when the animal is fed upon food analogous to the substance of its own

body, the vegetable apparatus is closed, being unnecessary. In the true carnivorous animals *there is no instance of more than one stomach*; and the length of the alimentary duct in some of them does not exceed that of the body. Between these extremes there is every variety of length and complication, according to the nature and variable proportions of the food. It may be observed, that all the varieties of food have corresponding contrivances for their digestion and elaboration. The food of carnivorous animals approaching in its constituent elements more nearly to those of the body than that of the herbivorous tribes, is more easily converted into nourishment in the former than in the latter case. Hence arises the chief distinction between the stomachs of these two orders of animals.”\*

We have been particular in quoting thus largely from different authorities, in order the more clearly to show that the great distinctive characters of these two orders, the carnivora and herbivora, are such as to render altogether untenable, the opinion entertained by Mr. Kirby and others, that the former originally subsisted on a vegetable diet; and we are therefore constrained, not only from the statement in Scripture of the nature of

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\* Burnett on the Power, Wisdom and Goodness of God, &c. p. 284.



the food allotted to the animal classes, but likewise from the facts and laws of Nature, to believe that during the first short period of organized existence upon the Earth, no species of carnivorous or otherwise predaceous animal then inhabited the dry land. We are constrained to this belief from the fact, that, if carnivorous animals had been restricted to a vegetable diet, they must have been furnished with a very different organization from what they have at present, it appearing to be, in most cases, almost absolutely necessary that an animal, subsisting exclusively upon vegetable substances, should be furnished with a very different digestive apparatus from that of the carnivorous races, from which it becomes a positive certainty ~~that~~ that the carnivora did not exist at all, or that their organization and habits have undergone a total revision and change since that period, a circumstance which would virtually amount to the *first creation of carnivora*. In the same spirit it may likewise be urged, that if the days of the creative week may be construed into periods of indefinite duration, as many would have us believe, and if each period was marked by creations peculiar to itself, we shall find that while, during the fifth period the various tribes of fishes and birds were created, the insects which constitute the food of some birds, were not created until the succeeding period of years;—so

that, like the carnivora, the insectivorous tribes must either have fed upon vegetable substances, or fasted altogether, during the fifth indefinite period, a circumstance of itself at once sufficient to refute the hypothesis. In the simple account furnished by the Book of Genesis, we find that the only food allotted for the sustenance of animal life, was that of the herbivora; and that food, we are told, was furnished on the third day, previous to the creation of those beings for whose use it was intended. This is an arrangement perfectly consonant to reason, for we cannot but feel assured that the food would be provided before the animal which was to be sustained by it; and *therefore it is contrary to reason* to imagine that the insectivorous birds were created on the fifth day, while their food was not supplied until the next day. These considerations, consequently, tend to prove that no predaceous animals, of whatever class or tribe, had existence during the short reign of innocence,—but that they were subsequently created in such numbers, at such times, and in such situations as circumstances required.

Kirby and others have imagined it necessary to exclude the predaceous tribes, chiefly to get over the difficulty, which otherwise occurred to them, of reconciling the existence of such animals with the statement that *death* came into the world consequent on Adan's transgression. Now

it is remarkable that while in respect to the creation of the *terrestrial* classes, the Earth is simply desired to "bring forth the herb, and living creatures after their kind," the *waters*, on the other hand, are commanded to "bring forth *abundantly* the moving creature that hath life,"—as if conditions were imposed upon them which did not equally extend to the terrestrial classes. This marked difference may probably have arisen partly out of the *insular* character of the land upraised, which being of limited extent, required no great number or variety of terrestrial species to furnish it; nor would the small number of these have rendered it necessary to provide those checks upon undue increase, which, in after times, the welfare of the system imperiously demanded. In the water, however, the case was quite the reverse of this; the almost boundless expanse of ocean, whose surface was scarcely broken by the limited extent of dry land existing during that primitive epoch, presented a vast field for the production of animal life; and there, accordingly, we find that the mandate is not only to bring forth the moving creature that hath life, but to bring it forth "abundantly." From this circumstance we may perhaps infer, that while the comparative paucity of terrestrial species rendered the presence of carnivora unnecessary, and therefore that the land was furnished solely with herbi-

vorous species, as indicated in the grant of food, and by the fossil flora of those early times, the numbers which were swarming in the warm and genial seas, would, on the other hand, have rendered the presence of predaceous species indispensable, an hypothesis which may not only derive support from the fossiliferous deposits of the early seas, but likewise from the remarkable fact, that, while the Scripture is particular in allotting vegetable food to man and the *terrestrial* animals, it is altogether silent on this point in regard to the aquatic tribes; from which silence we may perhaps infer, what indeed the earlier deposits declare, that carnivora already existed in the waters; and, therefore, that the lower types of animal existence were already subject to that death, from which man was as yet exempt. Indeed, if the vegetation and the waters of that period were infested with animal life to no greater extent than in the tropical climates of the present day, death must have been of daily and even hourly occurrence, more especially among those minute species which, resorting to fruits and flowers for shelter and for food, would have been crushed in numbers by herbivorous animals, albeit unconscious of the havoc which they made. Thus then it would appear that we have deduced evidence both from Scripture and from nature, to show that *the six creative days* of Genesis were each of *twenty-four hours'* duration; that the

animal and vegetable races have not been diffused either from central foci, or from single pairs, but that they were created in such numbers as was found conducive to the general welfare of those regions in which, and for which they were created; that species have a true and lasting existence in nature, and have not progressed from the lowest to the highest types of organization by the mode of transmutation; and lastly, that none of the *terrestrial* species of carnivora or other predaceous tribes had existence until after the fall of man.

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## CHAPTER XVII.

ERA OF MAN'S CREATION CONSIDERED; NON-DISCOVERY OF HUMAN REMAINS NO PROOF THAT MAN DID NOT EXIST UPON THE EARTH; ARGUMENTS DERIVED FROM FORMER NON-DISCOVERY OF QUADRUMANOUS ANIMALS; HUMAN REMAINS NOT LIKELY TO BE FOUND AMONG THOSE OF FERAL BRUTES; PROOF THAT MAN WAS CONTEMPORANEOUS WITH ALL THE ORGANIC BEINGS WHOSE REMAINS ARE IMBEDDED IN THE VARIOUS STRATA OF THE EARTH.

“AND God said, ‘Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle and over all the Earth.’ So God created man in his *own* image, in the image of God created He him; male and female created He them.”

It is maintained by most modern geologists, that man was not created until subsequent to the completion of the tertiary strata; which is thought to correspond with the opening of the creative week of Genesis, and is therefore termed the historical era of man. It follows, therefore, according to these views, that all those organized beings, whether of plants or animals, the abundance of whose exuviæ now constitutes the chief phenomenon of the fossiliferous strata from the earliest

secondaries or transition beds up to the completion of the tertiary formations inclusive, must have lived and died previous to the creation of the human race; while the creations recorded in Genesis have reference, it is supposed, to those animals which have lived contemporaneously with man. It is, in fact, the occurrence of these numerous strata, containing, in some instances, fossils peculiar to themselves, together with the great depth or thickness of the whole, that seems to have given rise to the belief that vast numbers of years must have been occupied in their deposition; while, at the same time, finding both from the testimony of the Scripture and from other historical data, that the human race is comparatively of recent origin, or little more, according to the best calculations than 7,000 years old,—it was at once concluded, as the readiest mode of cutting the Gordian knot, that the ages, during which the fossiliferous strata were deposited, occurred previous to the creation of mankind.

But because these appearances present difficulties to our minds; and because we cannot "*in limine*," as it were, clearly perceive the laws and causes which placed these animal exuviae in successive strata of great thickness, and yet that they should all have been contemporaneous with man himself, whose remains are not found, it does not, therefore, follow that the fact was not so, for we

know by every day's experience that many of the seeming impossibilities of former years have nevertheless in after times been found quite possible and easy; all that was wanting being the proper key by means of which we might read the phenomena correctly. It may therefore remain for the scientific researches of future generations to prove indisputably by the discovery of his remains, that man was contemporaneous with the animals whose exuviæ are now brought to light, and that their loss and burial in the strata where they now occur, were caused alone by the two great revolutions which the Mosaic narrative furnishes, and both of which were brought about through the disobedience of mankind.

The non-discovery of human remains among those of extinct animals, although at best it affords but negative evidence, has been considered conclusive of the non-existence of man in the ages when such animals flourished; but this reasoning appears to be by no means either sound or satisfactory when we reflect that until very recently, no remains of any quadrumanous animal had been discovered in a fossil state; and it might therefore, with equal probability, have been urged that none of that tribe had existed in those by-gone ages of the Earth which are supposed to be indicated by the exuviæ of races now no longer living in our present times. Such an opinion, indeed, was actually main-



tained by many, and it has only been proved to be erroneous of late years by the discovery in France, in England and in India of fragments of the skeletons of such animals.

The inference drawn from the non-discovery of human fossils, can therefore be maintained on no surer ground than that of the former non-discovery of quadrumanous animals; for the non-discovery of remains cannot argue the non-existence of the human race *upon the Earth*, but only its non-existence,—or rather perhaps its non-destruction in those places which have hitherto come under the observation of inquirers. It should, likewise, be borne in mind that the localities which yield the greatest numbers of the remains of animals, such as the elephant and mastodon, the crocodile and hippopotamus, are precisely those which would seem to be the least likely to furnish human bones; for such animals would naturally have dwelt apart from man, in the rivers, lakes and forests of the former ages, precisely as do the analogous forms of the present day. Were an universal, or even a partial catastrophe now to overwhelm the Earth with ruin, we know that the wild races would be destroyed in places generally removed from the vicinity of man, who, on the appearance of danger, would remove with his domesticated stock, from place to place in search of safety, until at last he would either find a

common grave with them, in situations far removed from those in which the wild races were destroyed ;—or, leaving his cattle to shift for themselves, he would either secure his own escape, or perish apart from all the brute creation. If then, in after times, his remains should not be discovered inhumed among the exuviæ of the feral brutes, the fact could scarcely give rise to much astonishment,—far less could it be cited in proof of his non-existence on the Earth at the time when they became extinct.

It is asserted that the occurrence of distinct exuviæ in widely separated strata, is a proof that one race became extinct ere another sprung into existence to supply its place ; and it is supposed, therefore, that these strata, with their peculiar fossils, may denote so many separate eras in the age of the Earth ; or, in other words, that a lapse of an indefinite number of thousands of thousands of years since the first creation, is necessary to account for those appearances which, according to the Mosaic history, have occupied a space of little more than seven thousand years. But it seems that the mere circumstance of successive strata, exhibiting different phenomena, is by no means a sufficient warrant for such a belief,—for it would not prove, as is erroneously asserted, that the races whose remains are not found with them in the same strata, *did not live with them*, but rather

that they *did not die with them!* Although, therefore, from some cause a certain tribe or several tribes might die, it would not necessarily follow that the other contemporaneous tribes must die also; for these may have been endowed with constitutions which would enable them to bear up against every change, and to descend even to the present time; and something of this kind appears indeed to be the case.

The dodo, (*didus ineptus*) a bird which was once abundant in the Isle of France, but which has now become extinct, may be cited as an instance tending to show clearly the fallacy of such a doctrine, for if, in succeeding ages, our posterity should discover the fossil exuviae of that singular bird, in strata containing none of the present living races of animals, they might, with equal truth,—or rather untruth,—declare that our present genera and species came into existence subsequent to the dodo's extinction; which we, who know to the contrary, can perceive to be a very arbitrary and false conclusion. Thus we must apply the same reasoning to the former ages of the world.

“It is evident,” says Phillips, “that all the probabilities point to the conclusion that the creation of man,—and all the new arrangements connected with that event are to be placed in some part of the supercretaceous period; but in what part is to be determined by further and cautious

research. We cannot undertake to decide so important a problem upon the mere negative evidence of *the absence of human remains* from tertiary deposits, because such negative applies only to the European and North American tertiaries, none other being explored. Moreover, the deposition of human remains in marine tertiaries must be supposed to have been extremely rare, and exceptional cases; nor could they be expected to occur often even in lacustrine or fluviatile deposits. But, as before observed, this negation, however important, is yet only a local truth; human remains may yet be found in tertiary strata in other parts of the globe; nor would it excite surprise if, among 95 per cent. of existing species of marine mollusca in the Sicilian tertiaries, human bones should once be met with. Or, if never in European regions this result should arrive, who is to assure us that in countries more early peopled than these "far western isles," neither lakes nor estuaries of the tertiary era received and preserved some remains of man or traces of his work? As far as direct observation or satisfactory inference goes, every honest geologist will allow that he is ignorant of the point of union between the historical and geological scales of time; that the era of human existence, if recorded in geological monuments has not yet been discovered among the small number which have been fully decyphered.

But where certainty cannot be had, it is right to inquire into probabilities. It seems fair to admit, both with reference to historical testimony and sound views of the economy of creation, that the existence, in any country, of a considerable number of the animals which now contribute to the comforts and necessities of the human race, is evidence of the establishment in that country of the conditions within which Providence has restricted the existence of man. No created terrestrial being is capable, by natural constitution, of sustaining such variety of external physical conditions as man can brave, through the exertion of those divine faculties which lift him above the inferior tribes of creation; if then the bones of the horse, the ox, the deer, of hares, rabbits, beavers, foxes and other characteristic animals of the present creation, are found in lacustrine tertiaries, what is to prevent our receiving as the most probable indirect inference, that the era of the creation of man had arrived when those strata were accumulated?''\*

Now, if it be reasonable "to admit that the existence, in any country, of a considerable number of the animals which now contribute to *the comforts* and *necessities* of the human race, *is evidence* of the establishment, in that country, of the conditions within which Providence has restricted the

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\* Phillips' Treatise on Geology 'Encyclopædia Britannica.'

existence of man;" and, if the occurrence of the bones of "the horse, the ox, and other characteristic animals of the present creation, in lacustrine tertiaries," is a proof that *such conditions had been established* in the countries where such deposits occur, why should we hesitate to declare,—when supported by such evidence and by the concurring testimony of the Holy Scriptures,—that man himself existed at the time when those animals became imbedded in lacustrine tertiaries? The very occurrence of such forms should, if the above doctrine be correct, be at once accepted as irrefragable evidence of man's existence; for it cannot be conceded that the All-Wise Being who does nothing in vain, would create such animals for the especial "*comfort and necessities*" of the human race, and yet destroy them before he, for whose use and benefit they were provided, had commenced his existence! Such a doctrine seems, indeed, utterly to refute itself, for, if the existence of those animals, in any country, proves that the era of man's creation had arrived, their destruction and occurrence in the lacustrine tertiaries before his creation, must either prove the doctrine to be false, or that he too existed at the time when those tertiaries were deposited.

From this line of reasoning it would likewise seem to result that if "the creation of man and all the new arrangements connected with that event

are to be placed in some part of the supercretaceous period," he could not have existed in those periods which preceded the deposition of the tertiaries; but that he was created about the time when those strata, which contain the remains of "the horse," &c., were deposited. Now these tertiary strata ARE ALL POST-DILUVIAL,—that is, they were deposited, as we shall hereafter see, during the retreat of the waters into those places from which they are not again to be allowed to trespass. Of this, more will be said in the proper place; but in the meantime let us see the consequence of fixing upon this last period as that of man's creation; and first, we shall perceive the startling fact, that if the termination of the tertiary era was that of man's first appearance upon the Earth, he could not have lived in that age which preceded the Mosaic deluge; therefore, that the deluge was not, and could not have been the consequence of man's depravity; for, according to the above hypothesis, he actually did not exist until after that deluge had subsided;—and thus the Scriptures are made to set forth a foolish and unmeaning fable; secondly, if the Bible is to be received as The Book of Truth, and not as a mere fiction, we must at once perceive the folly of asserting that man did not exist upon the Earth at the time when the animals, whose exuviae are now found inbedded in the earlier strata, became

extinct, inasmuch as that Book points out that their death,—and the violent changes which have been operated upon the globe, were consequent on man's transgressions and disobedience; from which we derive a most decided and conclusive proof, that the period of his creation *was prior to the extinction of any organic being whatsoever!* Consequently, although from the non-discovery of human remains, we derive no proof that man either was or was not living on the Earth during the earlier periods, yet we have in the discovery of the remains of other organic beings, a sure and decided testimony that he actually was living; inasmuch as, the extinction of those beings was the consequence of his rebellion. The whole of these unorthodox opinions have necessarily proceeded from the first error of dividing the two opening verses of Genesis, and from the wish to make it appear that the fossil exuviæ of the strata are the remains of animals which lived and died during the undefined beginning, previous to the creation of man. Having, however, as we think, brought forward abundant evidence to show not only that the first paragraph of Genesis must be taken as a whole and be understood to refer to the state or condition of the material elements of the Earth at the time when it pleased the Almighty to create them,—but likewise that these now fossil animals must all have lived subsequent to the first record-



ed day when light first visited this planet; the theory which would assign them to ages preceding the creation of man is at once seen to be refuted, for in every instance, the darkness which is universally allowed to have overspread the Earth at the termination of "the beginning," is accompanied by *vapours* and the *atmosphere*; and as both of these are dependent upon the Sun for their existence, and *daylight* is the joint production of Sun and atmosphere, it amounts to a positive certainty, not only that the alleged darkness could not, under such circumstances, have had existence, but, likewise, that there could have been *no light* during "the beginning," or previous to the first recorded day. The animals, therefore, which are now found in a fossil state, have lived and died upon our present Earth subsequent to that day, and to the production of light; they were consequently created subsequent to the opening of the so-called historical era, from which man himself is permitted to date; and thus, so far from having become extinct *previous to his creation*, he is proved to have been *contemporaneous with them all!*

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## CHAPTER XVIII.

STATE OF THE EARTH AT THE CLOSE OF THE SIXTH DAY;  
LIMITED EXTENT OF LAND; ELEVATED TEMPERATURE PROVED  
FROM THE STRATA OF THE EARTH; THE TERM PARADISE OR  
GARDEN OF EDEN APPLICABLE TO THE WHOLE PRIMEVAL  
EARTH.

“AND the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul. And the Lord God took the man, and put him into the garden of Eden to dress it and to keep it. And the Lord God commanded the man, saying, ‘Of every tree of the garden thou mayest freely eat: But of the tree of the knowledge of good and evil, thou shalt not eat of it: for in the day that thou eatest thereof thou shalt surely die.’ ”\*

Having now seen, in accordance with the narrative of Holy Writ, how the Earth, with all its goodly furnishing of vegetable and animal life, was formed, let us, ere we proceed to trace out the changes that have since occurred, pause to consider the appearance which it then presented, and the relative proportions of land and sea previous to the Fall. It cannot be denied that God, being Omni-

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\* Genesis.

scient and foreseeing all things, must necessarily have known previous even to the creation of man, that he would not only soon disobey the command imposed upon him, and be in consequence expelled from the state of happiness he at first enjoyed; but likewise that his posterity would in time become so wicked and depraved, as to draw down a curse upon the Earth which would destroy it together with the inhabitants thereof. Admitting, therefore, that God undoubtedly possessed this foreknowledge of coming events, it is but consistent with reason to believe that all things were expressly ordered and adapted to meet the contingencies which might arise during those two periods of creation which were to continue, the one only till the fall of man, the other till the deluge; that is to say, God foreseeing that the Fall and the Deluge would each, at the end of a certain time, be the termination of the increase and diffusion of the organic kingdom, as constituted in each respective period, limited the dry land to an extent sufficient for the purpose of producing vegetation for that animal life which during those first periods were to inhabit it. It is, indeed, evident that during the years which elapsed previous to the Deluge, the human race could not have multiplied to such an extent; and, consequently, would not have required such a range of countries as in the ages which were to elapse subsequent to that event. From

these facts, therefore, we may reasonably infer the existence of a larger proportion of dry land in these later ages, than in any former period, and we shall find, as we proceed in the history of events, that such really appears to be the case; while, by adopting Mr. Lyell's theory, we may be able to show by what means the warm temperature of antediluvian countries, indicated by the remains of animals analogous to those now only living within the tropics, have been reduced to the climates of our present Earth. As, therefore, the period of man's diffusion was limited to the ages which preceded the Mosaic Deluge, it may be supposed that the land, which on the third day was upheaved, was not of any vast extent, but merely sufficient to produce, by its corresponding subsidences, a hollow bed capacious enough to draw down and contain the water from the disrupted surface or dry land. Supposing, likewise, with Mr. Lyell that the land was chiefly confined to the equatorial regions, the comparative lowness of the mountain ranges which may elsewhere have adorned the surface of the Earth, by furnishing no resting place for eternal snows, would have had little or no effect in cooling the currents of air which swept over them; and thus the torrid climate of the primeval world would have met with no check to its temperature, such as we experience in these later times; for, "if during the long night of a

polar winter, the snows should whiten the summit of some Arctic islands, they would be dissolved as rapidly by the returning Sun, as are the snows of Etna by the blasts of the Sirocco;”\* or if there “were no Arctic lands to chill the atmosphere, and freeze the sea, and if the loftiest chains were near the line, it seems reasonable to imagine that the highest mountains might be clothed with a rich vegetation to their summits, and that nearly all signs of frost would disappear from the Earth.”† It is not difficult, therefore, under such circumstances, to perceive that the species of marine organic beings, whether of corals, shells or plants would have swarmed in such genial regions as the Almighty Goodness had provided for their use. The animals of that far distant period are now only known to us by the exuviæ which are found imbedded in the lowest of the fossiliferous strata, which evidently owe their origin to some revolution or convulsion which took place subsequent to the first separation of land and sea, and yet long prior to the last great catastrophe of the Mosaic deluge.

The first appearance of the dry land was caused, as we have endeavored to show, by the disruption and upheavement of the primary or granitic series,

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\* Lyell's Principles of Geology.

† Ibid., p. 191, Vol. I., *quod vide*.

which, as it has never yet yielded any traces of organic remains, is therefore reasonably inferred to have been formed before animal and vegetable life began. But the sudden and violent uprising of those rocks from beneath the bosom of the sea, must have given origin to vast quantities of debris and fragments torn from the shattered and uplifted strata, and as the retreating waves rolled tumultuously down the slopes and valleys of the uprising mountains, those fragments would have been again disposed in horizontal layers of earthy and gravelly soils, from which, in all probability, the primeval vegetation sprung forth on the latter portion of the third creative day. These may be termed the strata of *Cumbrian slates* which form the lowest portion of the transition series, and they are distinguished from the rocks of similar composition lying immediately above them, by being non-fossiliferous, a fact which, as in the case of the primary rocks, is owing to their having been deposited before the creation of any organized beings.

If, therefore, the primary strata were upheaved by the means we have ventured to suggest, and a limited quantity of water was thus drawn down, the consequent small protrusions would, from the imperfect drainage of the surface, appear like numerous islands in the surrounding seas; or the dry land, consisting of closely grouped islands,

might perhaps be said to abound with numerous extensive lakes or land-locked seas of salt waters.

These views will likewise be found to be in accordance with a hypothesis maintained by several eminent geologists, namely, that the arrangement of the sandstones and shales in the carboniferous group, "has resulted from the waste of small islands placed in rows, and forming the highest points of submarine mountain chains. The disintegration of such clusters of islands might produce around and between them detached deposits which, when subsequently raised above the waters, would resemble the strata formed in a chain of lakes; for the boundary heights of such apparent lake basins would be formed of the rocks once constituting the islands, and they might still continue, after their elevation, to preserve their relative superiority of height and to surround the newer strata on several sides."\* Granting, therefore, that the first dry land was composed of the primary and volcanic rocks, arranged in the form of islands so disposed as to enclose between them large areas of the ocean, it is probable that the waste and debris of such lands would have been disposed in horizontal strata in the lake basins or inland seas which washed their shores; and thus, when in after times the land became more extensively elevated

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\* Lyell's Principles of Geology, Vol. I., p. 200.

above the waters, not only would the transition deposits be found as in the present day, skirting and overlying the strata of the true primary rocks, but those areas of the sea, which had hitherto been spread out between the islands of the Archipelago, would now, from the uprise of the formerly submerged connecting chains or ridges, become in reality converted into extensive lakes and inland seas, sometimes entirely enclosed, in other instances still connected, by outlets, with the ocean.

That the countries of the primeval world enjoyed a temperature, in all probability, higher than that of the tropical regions of the present day, appears to be now the general opinion of geologists. Proofs of this former elevated temperature are derived from the imbedded fossils of the secondary and tertiary strata in all the countries of the northern hemisphere; but, travelling back even to the earliest age, when the lowest of the fossiliferous strata were deposited, we still find indications of a temperature analogous to that of the tropics, in the remains of zoophytes and other marine animals which could only have existed in the warmest climates. "The flora of the coal appears to indicate a high temperature in the air, while the fossils of the contemporaneous mountain limestone, comprising abundance of lamelliferous corals, large chambered cephalopods and crinoidea, naturally lead us to infer a great warmth in the



waters of the northern sea of the carboniferous period. So also in regard to strata older than the coal, they contain in high northern latitudes mountain masses of corals which must have lived and grown on the spot, and large chambered univalves such as orthocerata, which indicate even in regions bordering on the arctic circle, the former prevalence of an elevated temperature. The heat and humidity of the air, and the uniformity of climate, appear to have been most remarkable when some of the oldest of the fossiliferous strata were formed. The approximation to a climate similar to that now enjoyed in these latitudes does not commence till the era of the formations termed tertiary; and while the different tertiary rocks were deposited in succession, the temperature seems to have been still further lowered, and to have continued to diminish gradually even after the appearance upon the Earth of a great portion of the existing species. The various characters of the carboniferous strata,—the continuity of the marine mountain limestone over vast spaces,—the apparent derivation of the fragmentary rocks from the waste of islands,—the submarine aspect of the volcanic products,—the insular character of the flora,—the absence of large fluviatile reptiles and of land quadrupeds,—all concur to establish the fact of the northern hemisphere having been pervaded by a great ocean, interspersed like the South

Pacific, with small islets or lands of moderate dimensions, and with insular or submarine volcanos. Such a combination of geographical circumstances if not neutralized by others of a contrary tendency in the southern hemisphere, must have given rise to a general warmth and uniformity of climate throughout the globe, for if there were no arctic lands to chill the atmosphere and freeze the sea, and if the loftiest chains were near the line, it seems reasonable to imagine that the highest mountains might be clothed with a rich vegetation to their summits, and that nearly all signs of frost would disappear from the Earth. A remarkable uniformity of climate would prevail amid the Archipelagos of the temperate and polar oceans, where the tepid waters of equatorial currents would freely circulate. The general humidity of the atmosphere would far exceed that of the present period, for increased heat would promote evaporation in all parts of the globe. The winds would be first heated in their passage over the tropical plains, and would then gather moisture from the surface of the deep, till, charged with vapour, they arrived at extreme northern and southern regions, and there, encountering a cooler atmosphere, discharged their burden in warm rain. If during the long night of a polar winter, the snows should whiten the summit of some arctic islands, they would be dissolved as rapidly by the return-

ing Sun, as are the snows of Etna by the blasts of the Sirocco.”\*

We have evidence, therefore, derived from the appearances of the earliest of the fossiliferous strata of the secondary era, that such strata were deposited at a time when the *dry land* was composed of the granitic and volcanic rocks; that such land was of limited extent and in the form of islands scattered over the northern seas, and that the chief mountains of those days were probably situated near the line, so as to raise the temperature of climates generally, and nearly to banish all signs of frost from the Earth; the vegetation of that early period is also found to be strictly in accordance with these views, and the tropical character of the marine zoophytes likewise confirms them; while, as Mr. Lyell observes, the absence from these early strata of the remains of the larger saurians, while they abound in some of the later formations, goes far to prove the non-existence of large rivers, and to establish the insular character of the primitive lands. The lakes and islands of that distant period were blessed with warm climates adapted to bring forth and foster the animals and plants with which they were supplied; zoophytes and shells of various forms were scattered among the weeds and plants

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\* Lyell's Principles of Geology.

which abounded from the surface to the depths below; marine products of different kinds swarmed in those hot and genial habitations; the islands and their shores were adorned with species of every kind which the damp warm climate of the new born Earth put forth in endless forms and beauty; ferns of gigantic growth, reeds, trees and flowers, together formed a forest scene in which the brute creation roamed at will. All was a perfect Paradise, and man, the owner of the whole, seemed but created to enjoy the scene; there was no toil, no labour, no fatigue; the fruitful Earth put forth spontaneously her richest stores, inviting by the beauty of her fruits, the notice of her lord and master. All was an ever verdant and unfading picture of the richest loveliness; the vegetable world was stored with plants of exquisite beauty, displaying in the richness of their fruits and general structure the infinite and surpassing skill of the creative hand. No pains, no sickness, no decay was known to change the perfect state of man's condition, there was no strife, no angry and vindictive spirits to break the harmony of the peaceful world; but love, devotion, and happiness without alloy reigned paramount. All smiled around, for man was created free from sin, and lord of all created things, with one restriction only, for "the Lord God commanded the man, saying, of every tree of the

garden thou mayest freely eat: but of the tree of the knowledge of good and evil, thou shalt not eat of it: for in the day that thou eatest thereof thou shalt surely die.”\* The dawn of our human existence was therefore ushered in with peace and gentleness; there was no strife, no thirst for blood; but all was quiet and serene and aptly termed in the figurative style of Eastern language, a garden or Paradise. Such term must be taken as applicable to no one particular spot; but to the Earth at large, which then enjoyed during the short reign of Innocence, a state of calm and peaceful happiness, to which the appellation of Paradise was well suited. But alas, this happy state was not destined to be of long duration; man disobeyed and fell,—and in his fall involved the ruin of the world.

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\* Genesis, ii. 16, 17.

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## CHAPTER XIX.

ERRONEOUS VIEWS ENTERTAINED BY PENN AND OTHERS REGARDING THE PERIOD OF THE FIRST GENERAL CHANGE OR REVOLUTION ; THE PERIOD ASSIGNED BY THE MOSAICAL GEOLOGISTS, FOR THE FORMATION OF COAL, PROVED TO BE ERRONEOUS.

MUCH misconception having arisen, among the Mosaic geologists, respecting the proper Scriptural period to be assigned to the first great revolution or catastrophe which was instrumental in reducing the climates of the primeval world to others more nearly approaching the temperature of the present times, it may be advisable, before we proceed to trace out the series of events which gave rise to the fossiliferous strata, to show in what respect the theories above alluded to are incorrect.

“ During a long time,” says Cuvier, “ two events or epochs only, the Creation and the Deluge, were admitted as comprehending the changes which have been operated upon the Globe.”\* These two events are the sole revolutions admitted by the Mosaical school of geologists,† and insisting, as it does, that the record points out only two

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\* Cuvier's Theory of the Earth, p. 38.

† Granville Penn, Fairholme, Rev. G. Young, &c.

periods of general change, it is constrained to refer the exuviæ of all animals both of the secondary and tertiary formations to the one catastrophe of the Deluge, and therefore is it that Cuvier has declared these periods to be insufficient. Nor is it at all surprising that he should have deemed them inadequate to account for all the changes which the Earth's surface has undergone, since the first of these periods was in fact *no revolution* at all, but occurred *before* the vegetable and animal races, whose remains constitute the chief phenomena of our strata, *were created*; and, therefore, it could have been, in no wise, instrumental either to their destruction or inhumation. A revolution implies the overthrow of an already established order of things, while here, in this first period, we know that there was no overthrow, but an originating or setting in order of things *which had not yet existed*; therefore, it was a *creation*, or calling into existence, of a system of things which subsequently was overthrown and remodelled. Consequently, the separation of land and water, by which our Earth was brought to light, can be regarded only as a *creation of dry land*, and such it appears to have been considered by the inspired historian, for he tells us that "in the beginning" *the materials*, from which the land was to be formed, were called into being, and that on the third day, (a period evidently remote from the beginning,) the interim

having been occupied in perfecting other arrangements, all tending to its ultimate welfare, the Earth was separated from the waters, and *the existence of dry land commenced*. It is true that the record mentions *two*, and only two, distinct *general revolutions*, but the Mosaic, equally with the mineral geologist has disregarded and passed over the first of them, which occurred not during, but subsequent to the week of Creation. Thus geologists are right in referring the fossil exuviæ of the palæozoic and secondary strata, to a period long prior to that of the Deluge. The second revolution is too clearly marked, and its consequences too obvious, to escape the notice of any one whose mind is not previously biassed by the errors of existing theories; but the historian enters into no details of the means by which the first was brought about, although he clearly points out *the effects* of it. This difference in the seeming importance of the two revolutions may have arisen from the fact, that the first did not, like the second, involve the loss of life to the human race; and, therefore, the record is content to point it out merely by its effects, leaving us at liberty to infer the causes; or it may even be that Moses himself was ignorant of the operations and means by which the facts he recorded were produced; nor was it at all necessary for the fulfilment of his task, that he should be made acquainted with more than the effects, for



his only object was to impress upon his people, and through them other nations, that God was the sole Creator of all things and the Dispenser of all the blessings and comforts they enjoyed; and moreover "it should be borne in mind," as Dr. Buckland has well observed, "that the object of the Mosaic account was not to state in what manner, but by whom the world was made."\*

In insisting upon the two Mosaic revolutions as the only ones which our Earth has experienced, it is merely necessary to show that they are the only *general* or *universal* convulsions which have occurred since the Creation, and which operated instantaneously in reducing the temperature of climates; and that they have both been expressly produced by the immediate and supernatural intervention of the Almighty power for particular purposes, namely, for the express punishment of man's transgressions. But while insisting upon this, it cannot be denied that natural causes were instrumental in producing local volcanic outbursts and disturbances of strata, as frequently in the former ages of the world as at present; nay, we are constrained to affirm that they were both more violent and more frequent formerly than now, a fact fully established by the existence of numerous extinct volcanos, and by the dislocations of strata

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\* Buckland's *Bridgewater Treatise*, p. 33.

in various formations. These are geological facts the truth of which no cavilling can diminish, but it will be at once apparent that such outbursts of volcanic matter would have been no more *general* formerly than now, and that they would have formed mere local phenomena affecting a limited area, although their action may have been violent and even long continued. While, therefore, it is necessary to insist with the Mosaic geologists that there have been but two general and super-natural revolutions, it is necessary, likewise, to maintain that local disturbances, from the operation of natural causes, “*have been numerous;*”<sup>\*</sup> and to this extent and no further the above declaration of Cuvier and others must be received as true.

The views entertained by Granville Penn, on the formation of *coal*, tend better than any thing else that can be urged, to upset the period he would assign to his first revolution; and we shall accordingly quote his own words in order the better to expose the error into which he incautiously betrayed himself. He tells us that “M. D’Aubuisson entertains a philosophical doubt whether this substance ought to be classed with *intermediate* or with *secondary* formations; and he therefore leaves the point undecided. That Mr. Hatchett declares his opinion to be ‘that coal is a *vegetable*

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\* Cuvier’s Theory of the Earth.

substance, consisting of *vegetable accumulations*, mineralized under vast strata of the Earth.' Now, since all naturalists are agreed in this one point, that our *present continents* were heretofore *the bed of the sea*; since beds of coals are found to lie in *concavities*, varying greatly in extent from a few to many miles, and containing numerous strata of coal alternating with *sandstone, clay, &c.*, which describes a formation analogous to an ancient *sea-bed*; since *marine* substances are found in the *adjoining* strata; and since numerous sea shells and even bones of marine animals are found in *imperfect coal*, as in that of Pomiers in Dauphiny, although none remain recognisable in *perfect coal*; a strong argument of *probability* seems to arise, that if the substance of coal is of *vegetable* origin, we are to seek for that origin in *marine vegetation*, and not in *terrestrial*; that the beds of coals, in their extensive *concavities*, were perhaps immense accumulations of *fuci, &c.*, loaded with the various animal substances which shelter among them, and which were overwhelmed by vast aggerations of the loose soils of the sea in the course of its retreat, and were left for decomposition by the chemical action of the *marine fluid* which they contained, and with which the *enclosing* and *compressing soils* were saturated. And this"—he continues—"may guide us to a final explanation of the phenomena which caused M. D'Au-

buisson to doubt whether he ought to connect coal with *intermediate* or with *secondary formations*; in the statement of which doubt, he approximates so nearly to the Mosaical geology. The *intermediate* class (he observes with Werner,) pertains to an *epocha*, when a revolution took place in Nature, which, according to the evidence of the numerous indications which we see, was perhaps the *most violent* of those that happened during the formation of the mineral crust of the Globe. There is, indeed, great uncertainty in fixing the limits between this class and those which adjoin it; but I think that they will be assigned with sufficient exactness, if we say, that the *intermediate class* is composed of the same rocks as the *primitive*, but alternating with some others containing relics of organic beings, and a particular sandstone. We may perhaps further say, that the *intermediate soils* are those which succeed in the order of time, from *coal beds* to the first appearance of *organized beings*. I purposely avoid affirming, in this definition, whether or not the *coal* pertains to the *intermediate class*. But if *coal* be *marine vegetation* originally produced in a bed which must have been of *the earliest intermediate formation*, since it was formed by the *first disruption and depression of primitive formations*, according to the Mosaical geology; then it will naturally be found at *the point*, at which the

definition of M. D'Aubuisson supposes."\* It is difficult to refrain from smiling at the absurdity which is involved in these contradictory statements of one, who, in his anxiety to upset the theories of what by way of distinction, he has termed the "mineral geology," has rushed headlong into errors which not only afford a complete refutation of the views for which he is contending, but actually convict him of being ignorant of the commonest geological facts. Thus, if his first mis-called revolution is to be dated from the period when land and sea were first separated; which separation, he tells us, was caused by the deepening and disruption of a portion of the Earth, in order to form a bed for the reception of the waters; we at once and without difficulty perceive, that *it was completed before the vegetation, from which he would derive his coal, was called into existence*; and, consequently, that it could have been, in nowise, instrumental to *the deposition of that which actually did not exist!* He has himself recorded in a subsequent chapter, the following words, namely, "*that this first revolution took place before the existence, that is, before the creation of any organized beings.*"† How then, he can refer the deposition of vegetable or organized matter, and the bones (?) of marine animals, to that revolution

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\* Penn's Comparative Estimate, p. 385 *et seq.*    † *Ibid.*, p. 431.

is indeed truly astonishing, and the more so since in his detail of the events which occupied the third creative day, he clearly shows us that the vegetation was called into existence *after* the convulsion which disclosed the Earth to view, was completed and past. "The mineral materials," he says, "which retained their primitive order and position in the undisturbed *dry land*, were here fractured, severed and dispersed, or in various ways disturbed; and the soils which had at first rested on their rocky bases, were necessarily displaced by the rupture of those bases, and being precipitated into the new profundity, together with the innumerable fragments of the broken rocks, formed the slimy or the shingly bottom of the new sea. *On that bottom and in all the varieties of its parts*, whether in its lowest depths, or upon the submerged masses which lay upon it, marine matter of every kind, *vegetable and animal*, was produced in abundance with the power of perpetual reproduction; and it continued to increase in quantity in a multiple ratio, during many ages."\*

It is very evident that this zealous and well intentioned author, from possessing little or no accurate knowledge of geology, has been entirely misled by the statement which he quotes from M. D'Aubuisson, namely, "that the *intermediate*

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\* Penn's Comparative Estimate, p. 217.

*soils* are those which succeed in the order of time from *coal beds* to the first appearance of organized beings." Those who are acquainted with the position which the coal occupies, will at once perceive that M. D'Aubuisson here spoke of the strata in a *descending* order *from* coal beds *down to* the first appearance of organized beings; whereas Mr. Penn taking them in an *ascending order*, conceives the coal to be the *earliest deposit*, and to rest upon the primary rocks. From these confused and contradictory statements it becomes sufficiently apparent that the period hitherto assigned by the Mosaic school to the first revolution, must be entirely abandoned, it being quite impossible that the vegetation which was not created until *after* the separation of land and sea had been completed, could have been converted by that separation, into coal; especially since it has now been fully ascertained that that mineral was produced, not from marine, but from *terrestrial* vegetation; it therefore follows that the causes which tended to accumulate and mineralize this vegetable substance, must have been in operation subsequent not only to the first separation of land and sea, and to the production of dry land, but likewise to the furnishing of that dry land with a varied and luxuriant vegetation; for the coal is found to lie imbedded in strata which furnish evidence of a mechanical origin, they being composed

of the sediments brought down from the land by rivers, and deposited in estuaries, lakes or the deep waters of the sea. Thus the existence of dry land being absolutely necessary before the production of that vegetation which was to clothe it, at once satisfactorily proves that the convulsion which gave rise to the dry land must have occurred previous to the creation of the vegetable classes, and therefore that the coal was not the product of that separation, but is due to the convulsions of an after period.

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## CHAPTER XX.

PHENOMENA APPARENT IN THE TRANSITION ROCKS ; CONCLUSIONS TO BE DRAWN FROM THEM ; INSULAR AND TROPICAL CONDITION OF THE LAND AND CLIMATE ; EVIDENCES OF VOLCANIC ACTION, AND GRADUAL INCREASE OF LAND ; THE DEDUCTIONS OF GEOLOGISTS CONFIRM THE NARRATIVE OF SCRIPTURE.

In a work which to a certain extent is necessarily controversial, it can scarcely be expected that we should enter into any lengthened details of the circumstances which may have been conducive to the production of each minute division of our strata, even if we possessed the knowledge and ability requisite for such a task; all that can reasonably be demanded from us, is, that some general cause or causes should be suggested which may, in all probability, have been instrumental in bringing about those changes which have visited the Globe, and which may have produced the main features which characterise the different fossiliferous formations;—and this we cannot do better than by gleaning facts from the many excellent works on geology already before the public. In many mountainous districts the primary rocks described in the preceding chapters, rise in peaks

or mountain masses, uncovered by rocks of a more recent formation. More commonly, however, they are succeeded by others which bear a close resemblance to them and often pass by gradation into them. These have been called intermediate or transition rocks;—and it is in some of these that the fossil remains of animals and vegetables are first discovered, from which they are regarded as furnishing the most ancient records of organic existence on our Globe.\* This transition series comprises a vast mass of sedimentary deposits composed of slate and shale with slaty sandstones, limestones, and conglomerate rocks, and comprehends, according to Dr. Buckland and others, all kinds of stratified rocks from the earliest slates in which we find the first traces of animal or vegetable remains to the termination of the great coal formation.†

Although it was long contended that a positive break in the series of strata existed between the period of the carboniferous deposits and that of the next or new red sandstone group,—yet such is now found to be an error arising out of purely local disturbances,—for Mr. Murchison has found and recorded in his splendid work on the Silurian System that there is one continued, though some-

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\* Bakewell's Introduction to Geology, *passim*.

† Buckland's Bridgewater Treatise.

times locally disturbed series of rocks passing gradually into each other from the lowest of the fossiliferous strata, up to the termination of the secondary or cretaceous series.\* Here however a most decided break occurs, and not only has no passage whatever been yet discovered from the upper chalk beds into the lowest of the tertiary deposits,—but the imbedded fossils of the two systems denote a thorough change in the distribution of land and in the temperature of climates,—facts which have led geologists to declare “that with the secondary strata ended a certain general condition of the Globe, and with the tertiaries commenced a totally new arrangement. Moreover, because we find the marine tertiary strata distinctly related, in geographical expansion, to the present basins and arms of the ocean; as the organic remains which they contain are similar, and in rocks of later date, identical to those of the existing races in the sea and on the land; and as the tertiary sediments are of a nature very analogous to the daily products of the sea, estuaries, tide-rivers and lakes,—there is but a step further to unite the tertiary era with the historical period of the Globe.”† It is necessary that the reader should bear these facts in mind, as they may

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\* Murchison's *Silurian System*.

† Phillips' *Treatise on Geology*, p. 161.

hereafter prove of some importance in establishing a point of connection between the geological and historical chronologies.

The old red sandstone, according to Bakewell, is nothing more than a grey-wacke, *coloured red* by the accidental admixture of oxide of iron. In Monmouthshire, he adds, the passage from the one into the other may be distinctly observed; its connection also with the lower gritstone under the mountain limestone may be plainly traced. Here then we have the mountain limestone with its alternating beds of grit,—the red sandstone and the grey-wacke, evidently members of the same formation, and to make the connection more complete the red sandstone contains beds of limestone which form the link between the lower transition and the upper transition limestones.\* The connection may even be carried further and so be made to embrace the whole of the transition or lower secondary group,—for the mountain limestone is found in some localities to alternate with the coal measures, thereby denoting that the deposition of the two was contemporaneous, and appearing to show that while from some causes the marine fluid was precipitating its lime, the rivers of the land were bringing down vast quantities of vegetable matter,

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\* Bakewell's Introduction to Geology.

which floating for a time on the surface of the water would gradually, from time to time, have settled down layer after layer, as its weight increased, in alternate bands of limestone and vegetable matter. The quantity of oxide of iron and of red marl in some beds of the old red sandstone and its passage into *claystone* have led Bakewell to conclude that the red sandstone of Monmouthshire has been partly produced by an admixture with *submarine volcanic eruptions*. Many of the most eminent geologists appear to be favorable to the supposition that the earliest strata of this group were formed from the disintegration of clusters of small granitic islands which at that period were scattered over the northern hemisphere, and so grouped together that the waste and debris of their strata were spread out around and between their submerged bases in such a manner as to give them the appearance of having been deposited in lakes or basins. The climate and the vegetation of those lands were wholly tropical, and from the absence of the larger reptiles such as inhabit the rivers of hot countries, it is likewise reasonably inferred that no large rivers, such as would drain extensive tracts of land, existed; that the character of those early lands was insular is also "the opinion of many botanists who have studied with care the vegetation of the carboniferous period, and who declare that it possesses the character of an

insular flora such as might be looked for in the islands scattered through a wide ocean in a tropical and humid climate.\* But as we rise higher in the series of secondary strata, we find that this early state of things underwent important changes, and the lands of the northern hemisphere gradually increased in extent and elevation, giving birth to large rivers stocked with crocodiles and other fluviatile reptiles. These changes in the extent and position of the land would, according to the principles so ably laid down by Mr. Lyell, have caused a corresponding change in the climate and the vegetation, which latter, he tells us, "during some parts of the period in question (that is, from the lias to the chalk inclusive) appears to have approached to that of the larger islands of the equatorial zone; such, for example as we now find in the West Indian Archipelago. These islands appear to have been drained by rivers of considerable size, which were inhabited by crocodiles and gigantic oviparous reptiles both herbivorous and carnivorous belonging for the most part to extinct genera."†

To the carboniferous era of geologists succeeds that of the new red sandstone or saliferous system, composed chiefly of "sandy and argillaceous sediment accompanied by beds of salt and gypsum,

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\* Lyell's Principles of Geology.

† Ibid.

generally deficient in organic remains and only locally inclosing strata of limestone which commonly are characterised by abundance of magnesia. The lower portion of this system is said to be decidedly related to the coal deposits, and in fact that the coal is supposed to be only a local product in a vast mass of red rocks including the whole series of the old red and new red rocks. In this system the traces of terrestrial admixture are remarkable, and usually few; the shells and other organic exuviæ are marine; and it is only in a few places round particular mountain ranges that the remains of land plants and reptiles are at all prevalent. Several reasons might be adduced to justify an opinion that the time occupied in the production of the whole system *was comparatively short*, such as the general uniformity of its composition; the deficiency of limestones; the peculiar chemical and mineral character of these limestones; the general paucity of organic remains; the frequency of conglomerates and local admixture of fragments of igneous rocks; all these circumstances seem to indicate the predominance of an unusual series of agencies."\*

The Oolitic system which is the next in the order of succession and includes the lias, appears from the statements of the same author to be

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\* Phillips' Treatise on Geology.

“chiefly composed of calcareous beds in the south of Europe and of arenaceo-argillaceous beds in the north of Europe, the former having the air of an oceanic or deep-sea deposit, little disturbed by currents of water, the latter exhibiting the predominant influence of littoral agitation. The plants of this anomalous series may be viewed as a remainder of the vegetation of the era of the coal deposits transferred to a sea full of organic beings of the earliest Oolitic era. It is in this series that indications of the existence of large rivers are furnished in the remains of crocodiles and other large species of fluviatile reptiles, *proving the existence of more extensive tracts of land than during the period of the earlier deposits.* It is likewise an undoubted fact that during the accumulation of the whole of these fossiliferous groups from the lowest to the termination of the Oolite, *volcanic action was frequent and often violent,* disturbing and elevating in succession each of the systems we have been considering.”\*

From these statements, then, we seem to arrive at the following conclusions, which the reader will do well to bear in mind, as showing the close connexion which exists between the facts of geology, and the results to be inferred from the narrative of Scripture; namely, that the earliest dry land was

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\* Phillips' Treatise on Geology.



elevated in the form of numerous islands scattered over the northern hemisphere, and composed of granitic and volcanic rocks; that the temperature of climates throughout the Globe was then wholly tropical, a fact sufficiently attested by the character of the earliest fossil flora and by the remains of marine animals of tropical forms, occurring even in the strata of tracts bordering on the present arctic regions; from which, again, we are led to conclude, that while the northern hemisphere was studded with small islets, the principal and most elevated lands were then situated near the equator, an arrangement which, according to the views so ably developed in Lyell's *Principles of Geology*, was well calculated to raise the temperature generally over the whole Globe, and to banish nearly all signs of frost from the Earth; that during the period in which the transition and secondary strata were deposited, volcanic action was frequent and often violent, changing the outline of already existing lands, and giving birth to far more extensive tracts, drained by large rivers, which were inhabited by gigantic fluviatile reptiles; that the accumulation of a great portion of these strata was rapid, as testified to not only by the state in which the imbedded fossils occur; but likewise by the observations of Phillips on the mountain limestone; of Bakewell, Lindley and Hutton on the coal; of Phillips on

the new red sandstone; of Buckland on the lias, and of Lyell and Murchison\* on the Oolitic system; that *two periods* of extensive, if not of general convulsion, are pre-eminently prominent among the many minor changes which have contributed to modify the appearance of the dry land, the first occurring among the transition rocks and giving rise to the opinion as expressed by D'Aubuisson, "that it was perhaps *the most violent* of those which happened during the formation of the mineral crust of the Globe;" the second occurring at the period of the deposition of the cretaceous system, which, by the general consent of geologists, is allowed to have terminated the primeval condition of the Globe; while, with the tertiaries, commenced a totally new arrangement, with climates and organic beings approximating more and more closely to those of the present day.

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\* See the works of these various authors.

## CHAPTER XXI.

FALL OF MAN ; REDUCTION OF TEMPERATURE ; SUBMARINE VOLCANIC ACTION ; MOUNTAIN LIMESTONE A CHEMICAL PRODUCT ; RAPID ACCUMULATION OF STRATA ; CONGLOMERATE ROCKS BEAR TESTIMONY TO VIOLENT AND SPEEDY ACCUMULATION ; VARIOUS AGENCIES OPERATING SIMULTANEOUSLY TO PRODUCE A RAPID DEPOSITION OF STRATA ; EVIDENCES OF THE AGENCY OF VIOLENT VOLCANIC FORCES ; SPEEDY ACCUMULATION OF COAL BEDS ; FRESH CREATIONS NECESSARY.

“ AND unto Adam he said, because thou hast hearkened unto the voice of thy wife, and hast eaten of the tree, of which I commanded thee, saying, Thou shalt not eat of it: cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life; *thorns also and thistles shall it bring forth to thee*; and thou shalt eat *the herb of the field*; in the sweat of thy face shalt thou eat bread, till thou return unto the ground; for out of it wast thou taken: for dust thou art, and unto dust shalt thou return.”

From the declaration that the Earth should henceforward bring forth nothing but weeds and plants unsuited to be the food of man, unless wooed into fertility by the sweat of his brow and by the toil and labour of his hands, it seems not

improbable that the awful curse pronounced upon the ground for man's sake, consisted in such a reduction of temperature as to change the climates of the primeval Earth, from one which supplied him spontaneously with the choicest *fruits*, to one which would not even yield him the common produce of *the field*, unless sought for by unremitting pains and labour; and this view appears to derive considerable support from the after statement that "unto Adam also and to his wife did the Lord God make coats of skins, and clothed them;" for it is remarkable that while in their state of innocence they needed no clothing and saw no shame in the want of it, yet no sooner had they sinned than "they sewed fig leaves together, and made themselves aprons," such raiment being evidently adopted only for the concealment of their persons and not for clothing. Now, as it must be evident, that they would have been fully as susceptible of cold before their transgression as after it, or, in other words, that as the act of sinning would not have rendered them more susceptible of cold than during their state of innocence, so it seems proved by the mere fact of their requiring a more effectual clothing than that afforded by leaves; that the *curse* had wrought a great and decided change for the worse in the temperature of the climate, rendering it necessary that the guilty pair should now clothe themselves in the

skins of those animals which were offered as a propitiation for their sins in the sacrifices which were now for the first time instituted.

It remains for us therefore to ascertain by what means this reduction was brought about, and to read off, if possible, in the phenomena of the early fossiliferous strata, its effects upon the Earth.

If it be admitted that the facts above noticed are indicative of a change produced in the condition of the Earth and its climates consequent on man's disobedience, and therefore altogether independent of the natural course of events, then can there be no hesitation in admitting likewise, that such change was accomplished through the direct or supernatural intervention of the Divine power, who willed that those secondary or natural causes, which on the third day had given origin to the dry land, should now again burst forth with renewed energy to give effect to the curse which He had just pronounced, and by the more extended spread and altered distribution of the land, reduce and modify its climates and adapt them to the constitution of that organic system which was thenceforward to prevail. Here then was the cause of that "violent revolution in Nature" which is indicated by the disturbances in the transition strata, and again we trace out and fix an agreement in point of time between the chronology of history and the facts of geology.

The effect of volcanic currents bursting upwards through the depths of ocean, and pouring forth their copious streams of mud and lava, poisoning the waters as they ascended, and destroying life, would, as the sediments again subsided and arranged themselves in strata above the non-fossiliferous rocks from beneath, or through which the currents issued, have caused the instantaneous inhumation or imbedding of those myriads of organic forms thus suddenly destroyed, and generally too in those situations which they had previously occupied relative to each other. Nor must we forget that the uprising and subsiding lands would likewise simultaneously send down their streams and rivers charged with the ruins and debris to which the sudden and violent movement had given rise; neither must we overlook the powerful transporting agency of the waves displaced by such uprising lands, an agency equal, according to the volume so displaced, to the transport of any amount of conglomerates; and thus might have been produced that oft-repeated alternation of slates, grits, conglomerates, limestones and volcanic admixtures, of which the earlier series is composed. It is moreover "certain, that in the later part of the primary period (silurian) or perhaps after its close, great and general disturbances happened, which in many parts altered the aspect of the Globe, by raising up large tracts of land,

and dividing the expanded ocean by a multitude of mountainous islands.”\*

Granting then that the principal portion of the primeval land was situated in equatorial regions, the reduction of temperature to which the Scripture clearly alludes, may have been effected by giving extension, through the agency of powerful volcanic forces, to those tracts which had been scattered in the form of small islands through the regions of the north.

Now, the assumption of such submarine volcanic agency is by no means unsupported by the testimony of the strata, or by the opinions of able geologists, for Bakewell, we have already observed, remarks that from the quantity of oxide of iron and of red marl in some beds of the old red sandstone, and from its passage into claystone, he is inclined to believe that it has partly been formed by *an admixture with submarine volcanic eruptions*;† while Phillips too assures us that where “not much mixed with grits and shales, the mountain limestone [above the sandstone] is pure carbonate of lime; some of the beds are crystallized, and the general tendency of observation goes certainly to establish the conclusion that this limestone is an original deposit from

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\* Phillips' Treatise on Geology, p. 92.

† Bakewell's Introduction to Geology, p. 135.

the waters of the ocean,—not by desiccation—but by a *chemical decomposition of the fluid*, arising from some widely-diffused and long-continued agency;” the nature of which he supposes to have been a “liquid or gaseous substance generated in the submarine ocean-laboratory of Nature, diffused through the waters of the sea, from one or many openings on its bed, and causing similar decomposition at a nearly uniform rate through long periods of time.”\*

That *no* “long periods of time,” however, were necessary to complete this formation, notwithstanding its thickness, may be gathered from the fact that the organic remains imbedded in its strata, bear positive evidence to a *speedy deposition*, not only in the preservation, in some instances, of the entire skeleton,—but likewise in the retention of *the most delicate spines*. . . “The organic remains of the mountain limestone *are not at all worn*; but retain *all their sharp processes and spines in perfection*, except in particular situations, as in the conglomerate limestone which lies on the Greywacke near Ingleton and Horton.”†

“The mountain limestone,”—says the Revd. Pye Smith,—“consists almost entirely of the shells and coralline productions of sea animals, often a thousand and more feet in thickness. In this and

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\* Phillips' Mountain Limestone, p. 186. † Ibid, p. 185.



other limestones the imbedding part is not, as in other strata, a sediment from mere watery mixture, but the deposit from solution of carbonate of lime in water."\* So again does De la Beche inform us, that "in limestones, organic remains generally retain their original forms, and there is little evidence of compression, except in seams of marl which may be interstratified with them. The calcareous matter appears, for the most part, to have been deposited among the organic exuviæ from aqueous solutions of carbonate of lime, in the manner we observe on the small scale in different situations. *Solidity probably accompanied the envelopment of the organic remains, and hence they could not be compressed.* The same also has probably, to a certain degree, happened with the exuviæ in sandstones, the rock containing them not being capable of compression to a great extent. Variations in this respect may often be seen well illustrated in alternations of sandstones and shale, or in the mineralogical passages of one into the other."†

These facts all tend most conclusively to prove not only the unnecessary, but the impossible lapse of much time in the accumulation of the strata, for had not the calcareous matrix or "imbedding

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\* Revd. Pye Smith on Scripture and Geology, p. 404.

† De la Beche's Researches in Theoretical Geology, p. 283.

part" been speedily hardened around "the shells and coralline productions," so as to instantaneously enclose and hold them, as it were suspended in the rock,—they would one and all have sunk down by the mere force of gravity to the lower parts to form a thick stratum of animal remains beneath a vast mass of gradually accumulating calcareous matter, crushed and denuded of their spines and processes,—instead of being, as now, diffused throughout the entire rock.

The gradual and long continued accumulation of the old red sandstone strata has likewise been inferred from its containing such vast masses of conglomerate rocks composed of rounded pebbles and boulders, for the attrition or grinding down of which, vast ages have been thought necessary;—but if we admit that the fragments composing these strata were torn from primary and volcanic rocks, upheaved through the agency of that violent volcanic action which is observable among the lower members of the transition series, and that such rocks were themselves, if not fused, at least intensely heated by contact with volcanic currents,—we shall be at no loss to perceive how the rounding of the fragments could have been speedily accomplished,—for coming into contact with the cooler superincumbent waters,—not only would vast quantities of detritus be formed by the sudden contraction and splitting of the heated surfaces,

but the debris thus produced would, by exfoliation in the waters which were hurrying them along, have speedily assumed a rounded form,—while at the same time they would have given rise to vast accumulations of finer muddy or gritty deposits of clays and sands derived from the disintegration and decomposition of the felspar and the quartz of the granitic or primary series.\*

Conglomerates are usually attributed to the action of waters in violent commotion, and the greater the quantity of such masses and the larger the fragments of which they are composed, so much the more violent, and therefore the more rapid, must have been the operation of the agents which produced them. Since then, these conditions exist,—it will be seen that if the rounding of the imbedded fragments may be thus accounted for,—the accumulation of the old red sandstone deposits required no great length of time for its completion,—for the thickness of the mass can offer no obstacle to these views, if we admit of volcanic forces powerful enough to produce the materials;—and as it is undeniable that the extent of such power is absolutely beyond any assignable limits,—the fact of a speedy deposition or accumu-

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\* We have a familiar example of the effect here contended for in the case of highly-heated limestone which falls to pieces into powder—or only partially exfoliates on the application of water, according to the degree of heat to which it has been subjected.

lation of the old red sandstone seems likewise to be established. The non-occurrence of entire fishes or shells in conglomerate rocks is therefore clearly owing, not to the length of time which was required to deposit such strata, but to the violent attrition which the stony matter must have produced; hence perhaps the paucity of entire fishes in the old red sandstone of England, which "shows by its conglomerate beds, laminated micaceous gritstones and the fragments of land plants which lie in some of them, decided evidence of *violent watery* movements."\* In fact it would appear that the effects which geologists have hitherto mistakenly regarded as the results of causes which have continued in operation through countless ages, are in reality due to the intense and speedy action of powerful volcanic forces.

Again, as regards the coal, Bakewell points out the fact that very thin seams of that mineral sometimes alternate with the shale lying between two larger beds of coal, and he mentions a stratum of indurated clay or shale *about two inches in thickness* in which *more than twenty seams* of coal occur, none of which exceed the thickness of a wafer, but they are distinctly separated from each other by seams of shale. "These thin seams of coal and shale,"—he continues,—“were probably

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\* Phillips' Mountain Limestone, p. 186.

formed by alternate depositions of leaves or minute aquatic plants and of earthy particles forming layers of clay or sand. These are circumstances which appear to me to prove, that *the formation of the coal strata was effected more rapidly* than those geologists have hitherto been willing to admit, who have only examined coal mines, seated in an easy chair in their studies.”\* And again he adduces proof of speedy deposition, in the fact of a vertical stem of an equisetum passing through *three strata of sandstone nine feet in thickness*—and also of others from ten to twelve feet long in the coal mines of St. Etienne in France; and as these were the stems of hollow tubular plants without any woody support, it is impossible, as he observes, to believe that they could have remained erect in a warm temperature without speedy destruction or decomposition even for a limited time. *We are therefore certain that they were speedily encased* in the strata that now surround them, or in other words, that *three strata of sandstone, nine feet in thickness, were rapidly deposited.*”† Granting the truth of the speedy deposition of the sandstone, a question seems to arise as to whether these seeming strata may not in reality be only one, for it is evident from the

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\* Bakewell's Introduction to Geology, p. 180.

† Ibid, p. 181.

nature of the plants that had any cessation in the deposition of the sand occurred "even for a limited time" before the nine feet were completed, their "decomposition and destruction" must have ensued. Hence the apparent division of the mass into three separate strata must have been caused by the operation of some agency exerted after deposition, such perhaps as heat and pressure,—and if so, then many of the seeming divisions of our strata, which are now considered as the work of ages, may be more apparent than real, and the question of time be again in some measure negatived.

Although geologists appear to be now generally agreed that coal has resulted from the mineralization of terrestrial plants,—yet much difference of opinion still exists as to the precise circumstances under which its accumulation took place;—for instance Lyell declares that "the state of the plants and the beautiful preservation of their leaves in the accompanying shale preclude the idea of their having been floated from great distances;"\* while Phillips informs us that "the condition of the plants which compose the coal,—the general absence of roots,—the fragmentary state of the stems and branches,—the dispersed condition of the separable organs,—the splitting and reunion of coal beds, all the phenomena, in

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\* Lyell's Principles of Geology.

fact, really general confirm the conclusion that the plants whereof coal consists were swept down from the land on which they grew by watery currents, often repeated, and deposited in basins or large estuaries of the sea, or perhaps rarely, in lakes of freshwater.”\*

To these views, however, it is objected that “the fossils of the coal measures occur often in groups; thus in the roof of the coal in Felling Colliery, the remains of *Pecopteris heterophylla*, were, a few years ago, most abundant; they occurred alone, almost unmixed with any other, over a considerable space, but beyond that they have been rarely found, so that they are now comparatively scarce. Could such grouping have taken place if the individuals had been swept from a distance? Other arguments to prove that the plants which formed coal, were either not drifted at all or at least not from any great distance, may be found not only in the perfect state of the leaves of many ferns, but *in the sharp angles* of the stems of plants which there is every reason to believe must have been of a very succulent nature, such for example as *Favularia tessellata*; and many of the *Sigillarias*, some of which *occur with their surface marked with lines and streaks so delicate, that a day's drifting* would have injured them. Again, we

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\* Phillips' Treatise on Geology.

have figured a cluster of the fruits called *Cardiocarpon acutum*; had these been drifted, one would think they must have been dispersed, instead of being collected into one spot, just as if they had fallen there from the plant that bore them."\* As however the authors last quoted admit that there is perhaps reason to believe "that the fossils which we find irregularly interspersed in the sandstones or shales of this formation, may have, in some instances, originated from drifted vegetables," it seems fair to suppose that the views of each observer may to a certain extent be correct, and that the coal deposits may have taken place under various circumstances,—sometimes by deposits of vegetables in freshwater lakes,—sometimes in marshes where they grew,—sometimes in estuaries through the agency of rivers,—sometimes in deep seas, and more rarely by sudden subsidences of land; yet, in whatever situations accumulated, there seems in all or at least in most cases strong evidence to prove that the time occupied in arranging and imbedding such substances was short.

It is stated by the authors of the "Fossil Flora" that "fine caking coal being a crystalline compound, its constituents must have been in a state of solution," while cannel and slate-coal, occurring

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Lindley and Hutton's Fossil Flora, Preface, Vol. II.



in the same seam, still exhibit under the microscope the tissue of the original vegetables. But it may be suggested as equally probable that the perfect crystallization of the one part, does not betoken a solution, so much as the gradual refrigeration of the mass, after the action of intense heat and pressure, which, as in the case of primary limestone, may have converted the vegetable matter into a crystalline compound, impregnated in some instances with bituminous matter derived from volcanic agents; both minerals, indeed, seem to have been subjected to the same causes, for if we allow that vegetable matter collected into masses was sunk beneath strata of earthy sediments, and subsequently subjected to the action of intense volcanic heat from below, at a time when the pressure of the superincumbent strata and waters prevented the escape of the gases evolved, such gases, by acting as a flux or solvent, may have produced the crystallization of the coal, in a manner similar to that which, according to Dr. Hutton's theory, produced the primary limestone.

Bearing in mind then the supposed condition of the primeval dry land as already described in the foregoing pages, together with the various opinions of geologists regarding the accumulation of the transition strata, we may now attempt more particularly to describe the circumstances under which they have been produced.

It is curious, however, to observe how conflicting appear to be the views and statements of our most eminent geologists regarding the condition of the Earth at the time when the lower transition or silurian rocks were deposited, for while Lyell, Ansted and others remark that the insular character of the flora of those early times, as exhibited in the fossil plants of the carboniferous strata, together with the total absence of all large fluvial reptiles, is evidence of the *non-existence of large rivers*, and of the insular character of the lands, we have Murchison, on the other hand, declaring that "the black shale and schist, the red, grey and purple sandstone of the silurian and cambrian systems, were once nothing more than the finely comminuted mud and sand which were spread out successively *over the beds of great estuaries*; but *how vast must have been the streams* through which they were diffused! *The united powers* of transport of the *Ganges* and the *Amazon* must, indeed, have been in action during immense periods, to deposit masses of sediment so extensive, as those which we know were formed at that epoch, in Europe, Africa, and America. If the scale of these operations be surprising, equally so are the changes in the succession of deposits. The sediments poured forth to form the cambrian and silurian systems, indicate by their structure and colour, either that the lands whence

they were derived, successively changed their outline, some portions being elevated and others depressed, or that the affluent streams of the great transporting channels were from time to time directed into new directions.”\*

Doctrines so opposite and contradictory as these, are well calculated to retard the progress of geology, by converting its asserted facts into mere assumptions, to be indulged in according to the fancy of each observer; for, if one set of data furnish conclusive evidence as to the *non-existence* of extensive lands and large rivers, there cannot be other data to prove that such rivers *did exist*, inasmuch as truth cannot contradict itself. As, however, there appears to be a preponderance of evidence in favour of the views entertained by Lyell and others, as to the strictly insular character of the early lands, it becomes evident that the vast transporting powers attributed by Mr. Murchison to rivers must in reality be due to other causes. We must then call in the aid of volcanic forces and accordingly we find the last named author admitting that there were “*a multitude of eruptions amid the lower silurian and cambrian systems;*” and that “it would appear as if during the ancient periods of submarine accumulation, this region had been periodically much subjected to volcanic action,

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\* Murchison's Silurian System, p. 573.

which, though repeated in subsequent epochs *diminished in the intensity and frequency of its outbursts after the carboniferous era.*"\* Every fact therefore seems clearly to point to the conclusion, that the transition series, "pertains to an epoch when *a revolution* took place in nature, which, according to the evidences of the numerous indications which we see, was perhaps *the most violent* of those that happened during the formation of the mineral crust of the Globe."†

The great demand for time made by the modern school of geology, usually arises out of the vast thickness of the deposits, for, by comparing these with the alluvial accumulations now forming, it is conjectured that millions of ages would have been required for their production. If the forces in operation during past periods could be proved to have been no greater than those now acting, such an inference would no doubt be safe enough, but, since every thing in the appearance of the earlier strata denotes the often repeated occurrence of the operation of intense forces, in comparison of which all modern agents are utterly insignificant, we are by no means justified in taking the scale of existing operations as the standard by which we are to judge of preceding events. In viewing those vast

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\* Murchison's *Silurian System*, p. 572.

† D'Aubuisson's *Traité de Geognosie*.

masses of deposits, we ought rather to argue that, judging from the rate at which strata are now accumulated, these ancient beds must have been formed under one of two circumstances, namely, either *slowly*, through the operation of presently existing agents exerted through indefinite periods of ages; or, *rapidly*, through the operation of forces whose intensity can bear no comparison with those of modern agents. Now, since both the strata and their imbedded fossils do actually, according to the testimony of all geologists, in many instances, bear evidence to the fact of a speedy and nearly instantaneous deposition and imbedding, and since the traces of volcanic movements among all the earlier strata, are conclusive as to the almost incredible power which has been exerted in by-gone times, we are fairly and reasonably entitled to refer the effects we contemplate to the operation of natural agents, exerted upon a grander and more intensely powerful scale than in the modern era; and, therefore, to reject "*in toto*," as both unscriptural and unnatural, the doctrine of unlimited ages.

The enormous influx of volcanic mud from beneath the waves, and the heat and noxious qualities engendered in the waters, would have had the instantaneous effect of poisoning far and wide the inhabitants of the deep, residing within its influence; and, accordingly, these with the marine plants

growing on the shores or in the shallows would have furnished the first organic forms of the lowest strata; while vast accumulations of detritus from the shattered and exfoliating rocks, would be added, as the debacle retired from the uprising land, and as the streams and rivers were gradually left free to act.\* The changing outline of the land, as some parts were elevated, and some became depressed by the volcanic movements, would have given rise to streams in different quarters, charged with vast quantities of sedimentary matter, which, sinking amidst the volcanic muds and chemical precipitates from the marine fluid, would have produced the lower beds, while the exfoliating boulders and pebbles from the heated and disrupted granitic rocks gave origin to the vast masses of conglomerate strata, which alone speak volumes in favour of the intensity of the forces which produced them.

Nor is it at all necessary to declare that these effects were all instantaneously produced, for evidence exists that volcanic violence was often repeated during the accumulation of the transition series, and the narrative of Scripture, while it clearly and positively records the change that was effected, by no means obliges us to suppose that it

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\* See Lyell's Principles of Geology, p. 274, Vol. II. Lancerote, for similar effects.

was accomplished by one violent and terrific convulsion; all it insists upon, is, that a great change for the worse took place in the climates of man's abode, affecting generally the organic world throughout the Globe. Rapid, in comparison of the time which geologists have usually demanded, no doubt it was, but yet sufficiently slow to come within the bounds of perfect probability, but to say that volcanic forces could have produced these results *provided* a sufficient lapse of ages be allowed for the operation, is to set limits to a power, which, as far as we can see, is beyond the bounds of calculation; and, lost in astonishment though we may well be, at the vastness of the results obtained, yet to deny that such could have been produced except in the lapse "of millions of millions of years," is merely to furnish another proof of the total inability of our finite capacities to grasp or to conceive the infinite power of the agents employed to effect the will of Nature's Ruler.

Supposing, then, that the first effects of this volcanic eruption of mud and other substances were to give origin to the cambrian and silurian systems, the old red sandstone may be due to the vast transporting power, not of rivers, but of that debacle which the uprising and extending lands threw back, charged with the fragments produced by the joint effects of sudden contraction in the heated granitic and volcanic rocks, and of

mechanical violence. The mountain limestone may then again be attributed to the rapid chemical effects produced upon the waters of the ocean by volcanic gases, as Phillips has suggested, causing in some instances the instantaneous inhumation in the calcareous precipitates of those coralloids and shells which are sometimes so abundant as to nearly compose the rock. Various strata may likewise have been forming at the same time, for, granting the existence of rivers, draining the land from different points and falling into extensive estuaries or inland seas, it is obvious, as the same author has pointed out,\* that clays and conglomerates might have been of contemporaneous deposition with the chemical, calcareous precipitations of volcanic agency.

While these operations were going on within the bosom of the waters, the changes and disruptions on the land had caused the destruction of nearly all those vegetable forms which had clothed the primeval lands, and which, now that rivers of some force and magnitude had been produced by the uprise of more extensive tracts, were being swept down into various situations, where, whether in estuaries, marshes, or the sea, they were speedily inhumed. Of this fact abundant evidence is furnished by every observer, for, "whatever may

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\* Phillips' Mountain Limestone, p. 188.



have been the origin of those minute siliceous grains of which the sandstones of the coal measures are formed, the sand of which they are composed was not brought from any great distance, or formed like the sands of our sea-shore, by the slow action of attrition upon rocks previously consolidated. The sandstones are all more or less, micaceous, some of them containing that mineral in large quantity; where this is the case, and the plates are of considerable size, the stone is finely schistose. *This is another proof that the materials forming the sandstone, had undergone little mechanical action previous to deposition, or the fragile mica would have disappeared.*\*

While, therefore, every fact tends to establish a speedy deposition of the whole transition series, it is yet evident that coal would not always have been formed under precisely the same circumstances; some facts seeming to prove that in certain instances the plants of which it is composed were accumulated in freshwater lakes upon the land; others leaving little doubt of its having been buried beneath the sediments of estuaries; while, again, some deposits give evidence in the beautiful preservation of tender leaves and spines and sharp angles, of an instantaneous imbedding beneath the soils with which they were overwhelmed. May

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\* Lindley and Hutton's Fossil Flora, Preface, Vol. II.

not such instances be due to the sudden subsidence of land, or to landslips along the changing coasts, caused by the effects of those volcanic movements whose powerful aid we have enlisted?

What more immediate burial could be required than the sinking or subsiding beneath the sea of a densely-wooded tract of land? A few hours,—nay, a few minutes even,—might suffice to complete the accumulation of materials for a bed of coal of almost any thickness. Landslips along the island heights might also have buried vast masses in the shallow waters of the coasts, crushing in their fall the sigillariæ which grew abundantly in such situations,\* and enclosing all between the soils on which they had grown.

While all these various operations were going on, the aspect of the land was changing fast; wider and loftier tracts now stretched towards the regions of the poles, causing the primeval temperature to decrease, and thereby sweeping from the Earth many of the more tender plants and marine animals, whose constitutions rendered them unfit to live in any other climate than that which had just been changed.† But these newborn lands

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\* "Fossil Flora."

† "M. Agassiz has observed that a sudden depression to the amount of 15° of the temperature of the water in the river Glatt, which falls into the lake of Zurich, caused *the immediate death of thousands of barbel.*" Buckland's *Bridgewater Treatise*,—Note, p. 122.

were not destined to remain barren and uninhabited, and therefore fresh creations of plants and animals, endowed with constitutions adapted to the altered condition of the world, were necessary to furnish them, and to replace those forms which had now become extinct; and it is probable that the predaceous animals of the dry land were first created at this period in the countries where they were destined to reside. Man's earthly paradise was gone, and in its stead came cares and sorrows, sickness and decay. The happy region in which he had hitherto resided, was now converted from one of peaceful beauty and tranquillity, yielding spontaneously those rich stores which had likened it to a fertile and luxuriant garden, into a dreary blackened district of fiercely burning volcanos, whose flames and eruptions, in the highly figurative language of the Record, are likened to "the cherubims and flaming sword."

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## CHAPTER XXII.

PERIODICAL RECURRENCE OF VOLCANIC VIOLENCE ; NEW RED SANDSTONE TO BE CONSIDERED THE TERMINATION OF THE CARBONIFEROUS ERA ; DIVISION OF STRATA INTO SYSTEMS WHOLLY ARTIFICIAL ; THE CONDITION OF ORGANIC FOSSILS PROVES THE LAPSE OF TIME TO BE A FABLE ; FISHES OF THE CUPRIFEROUS SLATE SPEEDILY IMBEDDED ; SPEEDY DEPOSITION OF THE LIAS, PROVED BY THE CONDITION OF THE ICHTHYOSAURUS, PLESIOSAURUS, FOSSIL LOLIGO AND COPROLITES ; SPEEDY ACCUMULATION OF THE OOLITE PROVED BY THE CONDITION OF FISHES AND CORALS ; ANIMALS OF SUCCESSIVE PERIODS CREATED IN FULL MATURITY OF STRUCTURE.

It is not to be expected that an agent so powerful as that whose operations we have endeavoured to trace out in the preceding chapter, would have expended its forces in one terrible convulsive throe, and then again relapse for ages into a state of quiescence, but rather that it should long continue occasionally to exercise its powerful influence in modifying the distribution of land upon the surface of the Globe, and so gradually change its character from one of scattered tropical islands to that of extensive continents. And such in fact appears to have been the case, for the traces of violent and periodical convulsions are clearly per-

ceptible throughout the strata, not only during the continuance of the transition and secondary eras, but onwards, though with decreased intensity, even to our own immediate times. Abundant proofs indeed might be adduced "to show that the forces employed in dislocating the crust of the Globe were of extraordinary intensity. These well-registered phenomena are, we contend, absolutely inexplicable without the intervention of paroxysms infinitely greater than any of which modern times furnish examples; and yet we shall find, that such data, though drawn from the opposite extremes of the subject, are not in collision, and will not impede the onward march of our science. Judging from the facts before them, geologists are entitled to look to a deep-seated and widely-extended explanatory cause; and hence many have been led to believe, that all the ancient phenomena proving outburst and dislocation, have proceeded from a central heat, of which the volcanic ebullitions of past periods and the present are merely the external signs. The geologist, examining into the nature of the oldest crystalline rocks, sees in them the clearest evidence of the effects of intense heat, which, bursting out at intervals, through the sedimentary deposits, evolved the sheets of matter which constitute the axes and centres of mountain chains. He infers that central heat has subsequently been the source and great agent of the

mutations he traces, not only from the surpassing grandeur of the phenomena, but also because they harmonize with the probable relative conditions of such periods; for each succeeding accumulation of fresh sedimentary matter would necessarily tend to repress the power of heat proceeding from within, whether in the form of actual molten matter or of gas and steam. Each great igneous irruption, carrying with it fresh materials for additional deposits to be spread out on the bed of the ocean, would in fact be auxilliary to the repression of similar irruptions in future, by adding new folds to the pre-existing crust, which enveloped the central and heated nucleus. The question therefore is, does Nature teach us, that the most violent dislocations are apparent in our geological phenomena? If (as we firmly believe) she does, and further impresses on us the belief of *a former state of paroxysmal disturbance and chemical change, of much deeper rooted intensity and wider range than any to be found in our own period*; then the theory of central heat, as proposed by the mathematician, finds its best supporter in the geologist.\*

Granting then that the transition strata, to the close of the carboniferous series, were rapidly accumulated through the instrumentality of the

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\* Murchison's Silurian System, p. 575.

mechanical and chemical agencies above alluded to, it will be evident that the rivers of the new-formed lands would continue to be charged with terrestrial detritus, and plants forming the remainder of that system which had just been overthrown, long after the first violence of the outburst had passed away, and these being again spread out in layers or strata above the true carboniferous deposits, would bear a resemblance to the preceding series, while, at the same time, they marked the dawning of a different state of things; and thus may we, perhaps, account for the occurrence in the lower beds of the new red sandstone system, of genera which are thought more properly to belong to the preceding group; while higher in the secondary series, as might be expected, no traces of them are to be found. It is indeed the opinion of several observers, that the red sandstones, both old and new, form in reality but one thick mass of deposits in which the coal is locally imbedded, an opinion that seems well supported by the fact that some genera of shells, fishes and crinoidea belonging to the lower beds of the new red system, and which are not found about it, are common likewise to the carboniferous and primary fossiliferous strata;\* while M. Bonnard, a French geologist, describes the new red sandstone

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\* Lyell's Elements of Geology, p. 417.

as the upper portion of the coal formation.\* It would seem in fact that the division of the fossiliferous rocks into systems, however useful and convenient, is nevertheless perfectly artificial and arbitrary, it being now fully ascertained that there is a gradual passage from the one into the other throughout the series; hence it is evident that there was no break or cessation in the progress of accumulation,—although many facts exist to prove that the rate of such accumulation was unequal, some deposits having been produced more rapidly than others; and thus, with regard to the new red sandstone, Phillips informs us, that “several reasons might be adduced to justify an opinion that the time occupied in the production of the whole system *was comparatively short.*”†

That the doctrine, which would teach us to believe that many thousands of ages were necessary for the production of such systems, is purely fabulous, is conclusively demonstrated by the condition in which their imbedded fossils occur, for Dr. Buckland, himself a strenuous advocate for length of time, informs us that the fishes of the cupriferous slate surrounding the Hartz, have “a distorted attitude, which has often been assigned to writhing in the agonies of death. The true

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\* Bakewell's Introduction to Geology, p. 298.

† Phillips' Treatise on Geology.



origin of this condition, is the unequal contraction of the muscular fibres, which causes fish and other animals to become stiff, during a short interval between death and the flaccid state preceding decomposition. As these fossil fishes maintain the attitude of the rigid state immediately succeeding death, it follows *that they were buried before putrefaction had commenced*, and apparently in the same bituminous mud, the influx of which had caused their destruction.\* While, still higher in the series, it is conjectured that the lias may have been formed by deposits from muddy water contaminated with some noxious impregnation; “and at the same time to have destroyed, not only the testacea and lower orders of animals inhabiting the bottom, but also the higher orders of marine creatures within the regions thus invaded. Evidence of the fact *of vast numbers of fishes and saurians* having met with *sudden death and immediate burial*, is also afforded by the state of *entire preservation* in which the bodies of hundreds of them are often found in the lias. It sometimes happens that *scarcely a single bone, or scale has been removed from the place it occupied in life*; this condition could not possibly have been retained, had the uncovered bodies of these animals been left, *even for a few hours* exposed to putrefaction,

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\* Buckland's Bridgewater Treatise, p. 125.

and to the attacks of fishes and other smaller animals at the bottom of the sea.”\*

Could any thing more suddenly instantaneous than the production of such strata, and the imbedding of their organic remains, than is here stated to have occurred, be well imagined? Yet, fearing lest by these admissions of rapid death and burial, he should have proved too much, the Professor is careful to append a note, to the effect that, although from these facts it appears that certain parts of the lias were deposited rapidly, there are also proofs of the lapse of much time during the deposition of other parts of this formation. Referring to the passages pointed out in support of this assertion, we find one of the alleged proofs to consist of vast accumulations of coprolites or fossil dung of saurians, which are supposed to indicate that “the ancient sea bottoms,” where they occur, “must have been for a long period *the receptacle of the bones and fæcal remains* of its inhabitants.”† Now, the proof, of time supposed to have elapsed, is here said to be furnished by *the quantity* of deposited fæces; their *condition*, as militating *against* the lapse of time, is wholly overlooked; yet we find that “the state of preservation of these very curious bodies, *is often so perfect*, as to indicate *not only the food* of the

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\* Buckland’s Bridgewater Treatise, p. 124.

† Ibid. p. 189.

animals from which they were derived, but also *the dimensions, form and structure of their stomachs and intestinal canal;*” while, “their exterior also *retains the corrugations and minute impressions, which in their plastic state, they may have received from the intestines of the living animals.*”\*

These coprolites, we are told, “fell into soft mud whilst it was accumulating at the bottom of the sea,” where though they must have been acted upon for ages by the moisture which surrounded them, and by all the vicissitudes attendant on a changing sea bottom, until its beds were hardened into stone, they still retain the “*impressions of the mucous membrane!*”

But if the preservation of the scales and skeletons of the fishes of the copper slates is held to be indicative of rapid death and inhumation in the enclosing sediments, why is not the preservation of such delicate and fleeting impressions on the coprolite held to be equally conclusive? for, if the fæces passed from the animals with the surface in a moist or plastic state, the waters into which they fell would have dissolved every trace of the impressions, or the fermentation and decay in the aqueous mass would have had a like effect, unless indeed we are required to believe that they passed from the saurians in an *already indurated and crys-*

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\* Bridgewater Treatise, pp. 188 et 189 Note.

*talline condition!* But not only are they found to retain these impressions unimpaired, after the lapse of millions of millions of years, but skeletons of the animals to which they belonged are likewise discovered with them, their abdominal cavity being filled with fæces and the scales of fishes. One of these, an *ichthyosaurus*, represented in Plate 13 of Buckland's Bridgewater Treatise, is said to have the space within the ribs loaded with coprolitic matter; while the skeleton of another in the Oxford Museum "shows a mass of fish scales intermixed with coprolite throughout the entire region of the ribs; the mass is overlaid by many ribs; and, although in some degree perhaps extended by pressure, it shows that the length of the stomach was nearly co-extensive with the trunk."\*

If then these saurians died in the common course of Nature, and like the detached coprolites sunk down, and remained buried for ages in "the mud of the nascent lias," whence the pressure that has in some degree extended the mass of coprolite within the saurian? Had the animal merely fallen on the muddy bottom of the sea, while that mud was slowly accumulating through the course of ages, is it not reasonable to suppose that decomposition and the ravages of other predaceous animals would have torn the body to pieces before

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\* Buckland's Bridgewater Treatise, p. 191.

any weight of mud sufficient to cause such pressure could have been accumulated?\*

Or if, again, the animal became covered with "the nascent lias" before such destruction could have taken place, does it not prove that the accumulation of the mud was rapid? And since "the length of the stomach," in these gigantic animals, "was nearly co-extensive with the trunk" and was "loaded with coprolitic matter," "*the quantity*" of which is stated to be "*prodigious*," "when compared with the size of the animal in which it occurs,"† is it not perfectly clear that wherever, as in the instances under consideration, a number of these animals were speedily destroyed, there too would be found a vast amount of ribs and coprolite, without the necessity for supposing that such spots had been for ages the charnel-house of the species? independent of the fact that their being "abundantly mixed with teeth and *rolled fragments* of the bones of reptiles and fishes,"‡ shows that their death and deposition were due to some *violent* cause, and, therefore, that it *was rapid*.

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\* It is curious to observe how readily facts can be overlooked when they militate against the demand for time; in the case of the fishes, &c., of the copper slate and lias, this same author admits that they could not have remained uncovered "*even for a few hours*" without being destroyed by the attacks of fishes and other animals; yet it is sometimes convenient to deny this!

† Bridgewater Treatise, p. 190, Note.

‡ Ibid. p. 189.

View it which way we will, it still appears that “when we see the body of an ichthyosaurus, *still containing the food it had eaten just before its death, and its ribs still surrounding the remains of fishes,*” \* reason and common sense compel us to confess that the covering up and preservation of such specimen were, as in the case of the fishes of the copper slate, extremely rapid, and that the theory which would assign “ten thousand or more than ten times ten thousand years preceding the existence of man,” for the accumulation of such strata and their phenomena, however captivating it may appear to a marvel loving imagination, possesses in reality not the shadow of a foundation in fact.

Should other proofs of the rapid formation of the lias be required, we may gather them from the condition in which the *plesiosaurus* occurs, “a genus, the remains of which, after interment for thousands of years amidst the wreck of millions of extinct inhabitants of the ancient Earth, are at length recalled to light by the researches of the geologist and submitted to our examination, *in nearly as perfect a state as the bones of species that are now existing upon the Earth.*” Examples have been recognised in the same formations in different parts of England, Ireland, France and

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\* Bridgewater Treatise, p. 201.

Germany, and in formations of various ages, from the muschel kalk upwards to the chalk. The first specimen discovered *in a state approaching to perfection* was that in the collection of the Duke of Buckingham. Another specimen *nearly entire in the collection of the British Museum*, eleven feet in length, and *a still more perfect fossil skeleton*, also in the British Museum discovered by Mr. Hawkins in the lias at Street, near Glastonbury.\*

Still more conclusively convincing is the evidence furnished by the preservation of the pens and ink bag of the fossil loligo. "It was hardly to be expected," says Dr. Buckland, "that we should find amid the petrified remains of animals of the ancient world, traces of so delicate a fluid as the ink which was contained within the bodies of extinct species of cephalopods; yet the preservation of this substance is established beyond the possibility of doubt, by the discovery of numerous specimens in the lias of Lyme Regis. In 1829, I announced to the Geological Society, that these fossil ink bags had been discovered in the lias, in connexion with horny bodies resembling the pen of the recent loligo. I might register the proofs of *instantaneous death* detected in these ink bags, for they contain the fluid which the living sepia emits in the moment of alarm; and

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\* Buckland's Bridgewater Treatise, p. 203.

might detail further evidence of *their immediate burial* in the retension of the forms of those distended membranes, since they would speedily have decayed, and have spilt their ink, had they been exposed but *a few hours* to decomposition in the water. The animals must therefore have died *suddenly* and been *quickly* buried in the sediments that formed the strata in which their petrified ink and ink bags are thus preserved. The preservation also of so fragile a substance as the pen of a loligo, retaining traces even of its minutest fibres of growth, is not much less remarkable than the fossil condition of the ink bags, and leads to similar conclusions.”\*

Again, at Lyme Remis we find numbers of pentacrinites adhering to lignite in the lias marl. “The greater number of these *are preserved in such high perfection*, that they must have been buried in the clay that now invests them *before decomposition of their bodies had taken place.*” “The mode in which these animal remains are thus collected immediately *beneath* the lignite, and never on its *upper* surface, seems to show that the creatures had attached themselves, in large groups to the masses of floating wood, *which, together with them, were suddenly buried in the mud*, whose accumulation gave origin to the marl, wherein this

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\* Buckland's Bridgewater Treatise, p. 307.



curious compound stratum of animal and vegetable remains is imbedded."\*

A similar line of reasoning may be pursued in order to show that the calcareous beds of the Oolitic system were likewise speedily produced,—which indeed, as Murchison observes, “bespeak in the varied structure and colour of the deposits, *rapid and frequent changes.*”† Lyell seems chiefly to rest his arguments in favour of length of time, upon the occurrence of such myriads of corals and coralloid animals in these strata. He argues that it is not uncommon to find belemnites in different members of the series with full-grown serpulæ attached to them, and therefore as the belemnites were internal shells, they must have remained after the death of the animal, for some time unburied at the bottom of the sea, to admit of the serpulæ growing upon them. These cephalopoda, he says, from their swimming about in the open sea, may have left their shells to be imbedded indifferently in whatever sediment was then in course of deposition. But the corals are almost always confined to the limestones and are wanting in the dense formations of interposed clay, as also in the lias, these zoophytes requiring, not only carbonate of lime for their support and clear

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\* Buckland's *Bridgewater Treatise*, p. 437, Note.

† Murchison's *Silurian System*, p. 574.

water, but a bottom remaining for years unchanged by the shifting of sand or the accession of fresh sediments.\* But that this was not always the case is clearly proved by the rapid destruction and burial of the fishes imbedded in Oolitic limestone at Torre d'Orlando, in the Bay of Naples, where "M. Agassiz finds that the countless individuals which occur there in jurassic limestones, all belong to a single species of the genus *tetragonolepis*. An entire shoal seems to have been destroyed at once, at a place where the waters were either contaminated with some noxious impregnation, or overcharged with heat."†

Now, the time allowed by the Chronology of History for the completion of all the sedimentary deposits, from the lowest of the transition series up to the completion of the Oolitic beds inclusive, comprises, according to the Septuagint version and the researches of the best modern chronologists, a period of 2262 years;‡ a computation, the probable correctness of which, may be inferred from some remarkable corroborative proofs and coincidences hereafter to be gathered from the strata of the Earth. Let us suppose then, in accordance with the opinions of geologists, that during this

\* Lyell's Elements of Geology, p. 370.

† Buckland's Bridgewater Treatise, p. 124.

‡ Wallace's True Age of the World.

period, volcanic violence was paroxysmal,—producing changes in the extent and distribution of dry land and furnishing by the elevation and disruption of strata abundant materials for sedimentary deposits. The drainage of the land would be carried on by rivers, and detritus be spread out over the bottom of inland lakes and seas, as at present, only on a far more extensive and abundant scale. The first deposits after the cessation of those violent outbursts which had given origin to the transition series,—or rather perhaps we should say, the closing deposits of that era, would consist of sedimentary matter resembling that below the coal,—and would contain fishes, shells and corals of genera similar to those of the earlier beds. These are the strata of the new red sandstone.

While therefore the usual alluvial deposits were taking place through the agency of rivers flowing in from various directions,—the occasional violent outburst of some submarine volcano, while it tended to consolidate and disturb the lower systems, would have furnished abundant matter for fresh deposits. Now “the secondary strata are composed of extensive beds of sand and sandstone, mixed occasionally with pebbles, and alternating with deposits of clay, and marl and limestone. The materials of most of these strata appear to have been derived from the detritus of *primary and*

*transition rocks*; and the larger fragments, which are preserved in the form of pebbles, often indicate the sources from which these rounded fragments were supplied. The transport of these materials from the site of older formations to their place in the secondary series, and their disposition in strata widely extended, over the bottom of the early seas, seem to have resulted from forces, producing the destruction of more ancient lands, on a scale of magnitude unexampled among the actual phenomena of moving waters."\*

While then we perceive the *superior power* of the forces formerly employed, in accumulating strata, we must likewise perceive the necessity of admitting that such accumulation was *correspondingly more rapid* than at present,—*for in proportion to the one, would have been the other*;—and since it is acknowledged that the intensity of the forces operating in past periods was such as to admit of no comparison with the pigmy-like violence of modern times, so likewise must the accumulation of strata have been inconceivably rapid. We may therefore safely infer that the outbursts of volcanic matter by poisoning the waters through which the noxious gases and bituminous mud were diffused, would have speedily destroyed and in some cases have instantaneously imbedded the

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\* Buckland's *Bridgewater Treatise*, p. 68.

organic beings inhabiting those waters; while to these muddy and argillaceous deposits may have succeeded others of a calcareous nature; derived either from a partial decomposition of the marine fluid, through the agency of volcanic heat or gas, or from calcareous matter separated from the muddy volcanic injection.

Nor must we overlook the fact that every successive change in the distribution of the land, if of any extent, would have had a corresponding effect upon the climates, and that various species and genera of organic beings would consequently have become extinct after every such change; while their loss would have been compensated for by the creation of fresh species adapted to the new conditions. Nor is this supposition at all extravagant or adverse to the Scripture,—for although it does not at this period record the fact, yet reason assures us that unless such climates had been destined to remain desolate and unfurnished, some fresh creations were absolutely necessary; because the climates of the new formed lands were such as were unadapted to the constitutions of any of the previously existing races;—thus each succeeding change in the distribution of land produced a corresponding change in the organic world, one race being lost, as another sprung up to supply its place, while some few hardier species, though partially destroyed by local disturbances,

lived on through several (so called) eras, till they too became extinct at the period which caused the deposition of the chalk.

Lyell, to prove the necessity of a long lapse of time, urges upon our notice, the fact that the corals being full-grown must have lived for ages attached to the limestones of those eras, and he says, that “the great Oolite near Bath contains various corals, among which the *eunomia radiata* is very conspicuous, single individuals forming masses several feet in diameter; and having probably required, like the large existing brain-coral (*Meandrina*) of the tropics, many centuries before their growth was completed.”\* But it seems altogether to have escaped the notice of this excellent observer, that if successive changes in the relative distribution of land and sea, and in the temperature of climates, brought corresponding changes in the organic world, *each newly created being* was an *original creation*, and must necessarily have been produced *in full maturity of structure*; consequently his argument not only derives no support from the fact he has advanced, but seems in danger of being altogether refuted. “Different species of crinoideans, or stone-lilies”—we are told—“are also common in the same rock with corals; and, like them, must have enjoyed a firm

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\* Lyell's Elements of Geology, p. 372.

bottom, where their root, or base of attachment remained undisturbed for years. Such fossils, therefore, are almost confined to the limestones; but an exception occurs at Bradford, near Bath, where they are enveloped in clay. In this case, however, it appears that the solid upper surface of the 'great Oolite' had supported, for a time, a thick submarine forest of these beautiful zoophytes, until the clear and still water was invaded by a current charged with mud, which threw down the stone-lilies, and broke most of their stems short off near the point of attachment. The stumps still remain in their original position; but the numerous articulations once composing the stem, arms and body of the zoophyte, were scattered at random through the argillaceous deposit in which some of them now lie prostrate. The upper surface of the calcareous stone below is completely incrustated over with a continuous pavement, formed by the stony roots or attachments of the crinoidea; and besides this evidence of the length of time they had lived on the spot, we find great numbers of single vertebræ, or circular plates of the stems and body of the encrinite covered over with serpulæ. Now these serpulæ could only have begun to grow after the death of some of the stone-lilies, parts of whose skeletons had been strewn over the floor of the ocean before the irruption of argillaceous mud. In some instances

we find that, after the parasite serpulæ were full-grown they had become incrustated over with a coral, called *Berenicea diluviana*; and many generations of these polyyps had succeeded each other in the pure water before they became fossil.”\*

But if corals and crinoideans require a solid rock on which to fix themselves, it seems necessary, first, that the several calcareous deposits of the Oolitic series should each successively have had time to harden and become consolidated, before the corals could have become attached to their upper surfaces. Why then are they not always found at the point of junction with the superior clayey stratum as in the instance of those at Bradford, above alluded to? Or how is it that they are, on the contrary, almost invariably *imbedded in* the limestone *upon whose surface* they are said to have grown? If such animals really grew upon the surface of the solid limestone, and became occasionally destroyed by an influx of mud or clay, the position of those at Bradford is perfectly natural; but how are we to account for the dispersion of these bodies indiscriminately *through* a bed of limestone? Does it not seem clearly proved in such cases that the deposition of the lime and the imbedding of the crinoids were

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\* Lyell's Elements of Geology, p. 373 *et seq.*



simultaneous? and since these limestones appear by general consent to be referred to chemical, and not to mechanical agency; and since the perfect preservation in which many of the organic remains are found is held to be indicative of the instantaneous hardening of the calcareous matrix around them,\* do we not seem to be furnished with satisfactory proof of the rapid formation of such strata?

That the animals inhabiting the marine waters were sometimes suddenly overwhelmed and covered up by alluvial deposits from the land, is proved by the condition of those at Bradford; but this seems rather to have been an exception, than a general rule, and in most cases the dismemberment and dispersion of the remains,—not in mechanical, but in chemical deposits, seem to argue some sudden disruption or violent agitation from beneath the positions where the corals grew, such as that which might have been caused by the eruption of a submarine volcano bursting upwards from beneath the strata to which they had been fixed, and not only destroying and dispersing the animals themselves, but producing the calcareous matrix in which they are entombed by the decomposition of their reefs and of the marine fluid; a supposition which may perhaps find some

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\* De la Beche's Researches in Theoretical Geology.

support, from the concretionary structure of the limestone having been thought due to waters in a thermal state, and therefore connected with volcanic heat.

The fact of belemnites and fragments of crinoidea being sometimes covered with serpulæ does not argue the lapse of any longer time than that which Chronology can afford, for if, as we have already seen, the condition of organic remains in general proves a speedy death and burial to have been necessary, there seems to remain nothing but the thickness of the strata on which to ground a claim for time,—a claim which, if the agency of powerful volcanic forces is allowed to have most materially contributed to their production, can never be admitted; for the power of that agent to produce convulsion and disruption being, as far as we can ascertain, without a limit, it is clear that we have secured the co-operation of an agent equal to the production of any amount of mechanical and chemical deposits.

Granting therefore, of which we have furnished ample proof, that many of the deposits betoken an instantaneous production, we have still a period of more than 2,000 years for the completion of the series; and, coupling this with the further fact that every species of mollusk, coral, fish or saurian, as successively supplied, must have been created in full maturity of structure,—and that

the growth of *serpulæ* is stated to be rapid,\*—it is easy to perceive that these parasites (if indeed they were not a new creation)† may have had time to attach themselves to dead shells,—and yet that the world shall be no older than History records.

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\* “Penny Cyclopædia-Tubicolæ”—“Kirby on Animals,” &c.

† The *species* of *serpula* is not mentioned, though there are many;—if this particular species appear now for the first time,—no lapse of years would be necessary to enable either it or *Berenicea diluviana* to arrive at maturity—since they would have been *original creations*.

## CHAPTER XXIII.

THE PORTLAND AND OTHER "DIRT-BEDS" NO INDICATION OF DRY LAND ; BUT OF AN ESTUARY DEPOSIT ; PURBECK AND WEALDEN FRESH-WATER FORMATIONS INTERPOSED BETWEEN THE MARINE OOLITIC AND CRETACEOUS SYSTEMS ; INDICATIONS OF THE VIOLENT ACTION OF FRESH-WATERS ; SUCCEEDED BY SUBMERGENCE AND DIMINUTION OF LAND ; SUBSIDENCE OF LAND ; RISE OF CRETACEOUS SEA ; AND SUBSEQUENT INCREASE OR RE-APPEARANCE OF LAND.

FROM the period of the first revolution or Fall of man, up to the completion of the Portland stone or upper member of the Oolitic system, comprising, according to the most correct accounts, a period of about 2,261 years, the land was, from time to time, emerging from out of the ocean, through the instrumentality of violent and oft-repeated volcanic forces, whose seat of action being chiefly submarine, tended more especially to produce marine formations, imbedding the organic forms which successively inhabited the waters during the changes of those early times. Interstratified with these, occur likewise, accessions of detritus brought down by the various rivers of the land ; giving to the whole series a varied succession of clayey, sandy and calcareous strata.

From the reputed facts of Geology we have brought forward abundant evidence to prove that many of these deposits must have been of almost instantaneous production, and therefore that the time allotted by the Chronology of History will be fully sufficient to admit of the occurrence of every minor contingency. We have now to enter upon the consideration of those causes which produced the strata of the subsequent era.

Resting upon the Portland stone or upper member of the Oolitic system, occurs a stratum which is usually denominated the "*dirt-bed*," and which, from its containing the broken trunks and roots of trees in an upright position, is considered as indicating the presence of dry land in the spot where they are now found; sometimes this dirt-bed occurs even more than once, when it alternates with fresh-water limestones.

Above these is a series of freshwater strata, called the *wealden*, which is again in turn succeeded by the *greensand* and *chalk*. The occurrence of this "*dirt-bed*" is thought to prove that the marine Portland stone had become elevated into dry land "and had accumulated a soil of about a foot in thickness, composed of an admixture of earth and black vegetable matter;"\* then the forest of trees which had sprung up in

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\* Buckland and De la Beche.

the course of ages, was quietly and gently submerged beneath *fresh-water*, and buried in semi-lacustrine sediments, and afterwards with a series of marine deposits of greensand and chalk.\*

Now in regard to this dirt-bed, we gather from the statements of various observers,† first, that the black earth rests upon the marine Portland stone or Oolite, and is said to be from *one foot* to a *foot and a half* in thickness.

Secondly, that in this black earth the stumps of trees, some of which *are three and four feet in diameter*, are found in the position in which they grew, and with their roots attached to the earth. It must be observed, however, that it is admitted these stumps are sometimes *inclined*.

Thirdly, that the trunks of the trees are found *lying prostrate* and partly buried in the black earth, and it is remarkable that they *are all destitute of leaves and branches*.

Fourthly, that the movement which buried the forest, must have been *unaccompanied by violence* or “*the dirt*” would have been swept away.

These facts are said to teach us “not to set narrow bounds to the time which elapsed during their production,” for “*if* between the aggregation of marine and fluviatile sediments of the Port-

\* Phillips' Treatise on Geology.

† Buckland, De la Beche, Phillips and Lyell, &c.

land and wealden formations, *the whole life of large and stately coniferous trees has elapsed*, who will revive the unworthy folly of ascribing the curious proofs of regular and orderly structure, the rich monuments of physical changes, which the Earth offers to the eye of intelligent man, to a sudden deluge or any other violent catastrophe? It is time that the blind opposition to the progress of Inductive Geology, based on an erroneous view of the true meaning of the Scriptures, derived from days of ignorance, should be wholly abandoned.”\*

Now the question of *time*, has, we think, already been partly answered in the foregoing chapters, and more conclusive evidence of its agreement with the Chronology of Scripture, has yet to be added in the sequel; but the whole force of the question here put to us, rests upon the doubt which the author has raised in the simple word “*if*;” as, however, we are disposed to challenge the truth of the assertion that these trees grew upon the spot where their fragments now lie imbedded, and as we think the facts as stated by geologists will furnish us with ample means of combatting what we hold to be their erroneous conclusions, “who will revive the unworthy folly of ascribing the rich monuments of physical changes which the

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\* Phillips' Treatise on Geology, p. 146.

Earth offers to the eye of intelligent man," to any other causes than those which *the word of God permits*? "It is time that the blind opposition," to *the truth*, based on an *erroneous interpretation* of the Scriptures "be wholly abandoned;" for we have already shown that "the true meaning of the Scriptures" is totally at variance with the *modern geological interpretation* of them, inasmuch as the division of the two first verses of Genesis, is arbitrary and unauthorized; and, consequently, as the demand for time arises out of that erroneous division, the whole theory of the Pre-Adamite world necessarily falls to the ground, as a baseless vision. The "erroneous view of the true meaning of the Scriptures," is not therefore to be attributed "to the days of ignorance," but to the perverseness of those geologists, who, disregarding the plain and obvious reading of the text, in order that they may bend it to the support of an extravagant theory, which teaches the inconceivable duration of the past, wilfully persist in perverting "the true meaning," even after the clearest and most satisfactory evidence of their error has been laid before them.\*

Now, that the trees *did not grow* in the black earth, seems fully proved by the fact that it is

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\* See Professor Pusey's note in Buckland's Bridgewater Treatise, p. 25. Also chapter 2nd of this work.



never found much exceeding *one foot in depth*, and it is consequently quite incredible, if not impossible, that a soil, which in most cases would be insufficient to afford nourishment to our common garden vegetables and flowers, could have supported a forest of trees whose diameter was from three to four feet, and whose circumference therefore was *from nine to twelve feet!* and this fact becomes the more certain, when we are told that "*the dirt,*" is sometimes only "*from two to six inches in thickness,* in which are found fossil specimens of cycadeæ, analogous to living species of *cycas; they are erect and apparently in the exact situation in which they once grew.*"\*

Are we to believe likewise that these plants were nourished in "*from two to six inches of soil?*" Or, again, it may be asked, on what did this forest grow, before the production of the black soil, for that is said *to be due to the decay of vegetation?* If such be the case, the vegetation which produced it, must have grown on *some other soil;* yet of that soil there is not a trace left, the substrata being all marine.

Nor does the condition of the trunks, *broken off and prostrate, devoid of leaves and branches,* give much idea of a tranquil state; for, if "*the change from dry land to the state of fresh-water*

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\* Bakewell's Introduction to Geology, p. 321.

lake, or estuary, was not accompanied by any violent inundation or rush of water,"\* what caused the trees to snap off by the roots and remain prostrate on their native soil? A quiet inundation would merely have caused the trees to rot beneath the waters, where they stood; but these have been broken off; does it require *no force* to snap off a tree whose circumference is from nine to twelve feet,—and not only a tree, *but a whole forest?* If the imaginary forest had gradually subsided and been covered up by fresh-water sediments, the trees, if the movement was, as is asserted, unaccompanied by violence, ought to be found erect with their trunks and branches entire; yet the trunks, on the contrary, are prostrate and devoid of branches!

Nor can these appearances be accounted for by supposing the influx of fresh-waters to the situations where the forests grew, for if such influx was gentle, the trees would have stood erect and unbroken; or, if it were violent, the trunks instead of remaining prostrate, would have been *swept off* together with the black soil *in which* they are now partially imbedded. Besides which had the trees grown in the black earth, their broken trunks ought now to be found lying upon its surface, whereas they are partly imbedded in it, a

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\* Phillips' Treatise on Geology, p. 145.

sure sign that they and the black earth were deposited together. The occurrence, therefore, of these dirt-beds in the particular situations in which they are now found, is due to other causes than those to which they have hitherto been assigned.

Now, all the phenomena apparent in these fresh-water deposits, clearly indicate that the trunks and roots of trees were brought down from the land by some large river, swollen with heavy rains and bearing on its turbid waters, the exuvia of terrestrial vegetation, uprooted and destroyed by violent storms. This view, in spite of Phillips' notion of a tranquil subsidence, is moreover supported by the fact that indications of watery violence do actually exist, in the "rounded fragments of stone *from three to nine inches in diameter*, disposed through the dirt-bed in such numbers that it *almost deserves the name of gravel*."\* Further proof is to be gathered from the branchless state of the trunks and from *the inclined position* of many of the roots. The trees were in all probability snapped off or uprooted by the gusts of some violent storm of wind and rain; and the flooding of a river may have carried them down and dropped them in an estuary or lake, where the roots from being disencumbered of the top weight of their

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\* Lyell's Elements of Geology, p. 353.

leaves and branches, would have sunk down and assumed the upright position in which they had elsewhere grown, while *the leaves and branches* would have furnished materials for the carbonaceous bed of black soil in which the trunks and roots are now found; and this too seems, in some degree, to be proved by the occurrence of "root-shaped cavities, observed by Professor Henslow, to descend from the bottom of the dirt-bed into the subjacent Portland stone, so that the uppermost beds of the Portland limestone, though now solid, were in a soft and penetrable state when the trees"\* *were deposited*, forming in fact the soft bottom of the estuary or lake, which received the terrestrial exuviae.

The purbeck, or fresh-water strata, truly constitute the lowest portion of the wealden formation which overlies them, and which is itself an extensive fresh-water deposit in an estuary, containing organic "remains of fifty-two species, which, with few exceptions, are either of terrestrial or fresh-water animals, and nine species of terrestrial plants."† "Taken in a general view, this formation may be described as a series of clays and sands with subordinate beds of limestone, grit and shale, containing fresh-water shells, terrestrial

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\* Lyell's Elements of Geology, p. 355.

† Bakewell's Introduction to Geology, p. 382.

plants, and the teeth and bones of reptiles and fishes; the state in which the organic remains occur manifesting that they *have been subject to the action of river currents but not to attrition from the waves of ocean.*"\* Above these *fresh-water deposits*, reposes the cretaceous system, which is wholly *marine* and is composed in the lower part of greensand consisting "of sand, clay, marl and impure limestone, the materials of which might result from the wearing down of pre-existing rocks. The nature of these derivative rocks we learn [to be primary and volcanic] from finding in the greensand pebbles of quartz, quartzose sandstone, jasper and flinty slate, together with grains of chlorite and mica. But we naturally inquire how it could happen that throughout a large submarine area, there should be formed, first a set of *mechanical strata, such as the greensand*, and then over the same space a *pure zoophytic and shelly limestone, such as the white chalk*. The only hypothesis which seems capable of explaining such changes is the *gradual submergence of land* which had been *previously exposed to aqueous denudation.*"†

The organic remains in the chalk, together with its great extent and thickness appears to indicate

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\* Mantell's Geology of the S. E. of England, p. 180.

† Lyell's Elements of Geology, p. 332.

that it was deposited in a deep sea, while the marked and striking difference between its fossils and those of the succeeding tertiary deposits contained in the hollows and inequalities of its surface, have caused it to be regarded as the last or uppermost of the so-called secondary series. In conclusion, it is essential to bear in mind "that from the time of *the commencement of the wealden to far on in the cretaceous period*, we have signs of *subsidence* and consequent *diminution of land*. But *after the chalk was formed*, or during the tertiary periods, we have, on the contrary, *proofs of an increase of land in Europe*."\*

The geological phenomena of this period, then, according to the testimony of the best observers, seem to furnish us with these remarkable facts, namely, that *the dry land* was subjected to the abrading action of *fresh-waters* in violent motion, by which detritus was hurried to the sea intermingled with terrestrial plants and the rolled and broken bones of reptiles, fishes and shells; while the land itself was thickly covered with the sands and clays worn down from the pre-existing rocks. That this was accompanied by the *subsidence* and *diminution* of land, until its final *submersion beneath the ocean* which produced the chalk; after which the land once more *emerged*

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\* Lyell's Elements of Geology, p. 367.

and *increased* during the tertiary period. How well these statements of one of our most eminent teachers, accord with the simple narrative of Scripture, let the unbiassed reader judge. The causes which produced these changes will form the subject of the succeeding chapters.

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## CHAPTER XXIV.

THE SECOND CURSE ; MOSAIC DELUGE ; CAUSED BY THE SUPERNATURAL INTERVENTION OF DIVINE POWER ; HOW PRODUCED ; OBJECTIONS ANSWERED ; PROPHECY OF ENOCH ; RISE OF THE DELUGE ; DESTRUCTION OF THE ORGANIC WORLD.

FROM the time of the first great change in the climates of the Earth, we are taught, that the human race continued to multiply and spread over the gradually increasing countries of the Globe until man had become so utterly depraved and forgetful of his Almighty Creator, as again to provoke His wrath and call down a second curse upon the Earth and its productions, in the visitation of a general Deluge. That event is described as occurring from the breaking up of the fountains of the great deep and the opening of the windows of Heaven, until the waters stood uniformly over the whole Earth and "prevailed exceedingly; and all the high hills, that were under the whole Heaven, were covered. Fifteen cubits upwards did the waters prevail; and the mountains were covered."

Many objections have been raised against the universality of this event, even among those whose



geological knowledge should have guarded them against such errors,\* from an inability to conceive from whence a body of water sufficient to cover the tops of the highest *existing* mountains could have been derived, or to what reservoir it has again retired. It is argued that the highest mountains of the known world, rear their heads to a height of *five miles* above the level of the sea, and that the Globe being nearly 25,000 miles in circumference, it would require an incredible quantity of water, to deluge the Earth to an extent sufficient to cover the tops of these mountains. This seeming difficulty arises, in most cases, either from a want of acquaintance with, or a disregard of, geological facts, and is altogether removed when we consider that the fossil phenomena of the earlier strata, furnish undoubted evidence that previous to the Flood, the land was comparatively of limited extent in the form of large islands, the tropical character of whose fauna, precludes the existence, not only of the present distribution of land, but also of such elevated ranges as those which now adorn the Earth; and consequently that no such amazing body of water would be required.

It is the fashion with the modern school of geology, to declare that the Deluge was limited to a particular tract, and was not universal,—but

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\* Rev. P. Smith on Scripture, and Geology p. 151.

this is a doctrine which, while it is adopted as a compromise, is easily seen to be wholly at variance with "the true meaning of the Scriptures," inasmuch, as the Bible asserts that "*all the high hills, that were under the whole Heaven, were covered;*" had we been merely told that "*all the high hills*" were so covered, there might have been room for doubt and speculation as to whether the phrase was to be understood in an universal or partial sense,—but here there can be no reasonable doubt, since "*the whole Heaven*" clearly defines the meaning to be *universal*. But even granting that the phrase was intended to apply only to a particular country or region, and that like Britain, the mountains had an elevation of little more than *four thousand feet* above the level of the sea; is it not certain by submerging the Highlands of Scotland, that France and the neighbouring countries must likewise be overwhelmed to a similar extent? And if Europe were thus engulfed by a *rise* of the ocean, would other quarters of the world experience no change? The only *local deluge*, therefore, that could occur, would seem to be by the actual *subsidence* of that country beneath the waters. To this, however, is opposed the fact that "*all the high hills, that were under the whole Heaven, were covered;*" so that granting, which we may reasonably do, that some lands subsided, it is still necessary to believe that some

tracts still remained in other countries, whose hills and mountains were covered as the Scripture relates. That no existing laws could have brought about the catastrophe of the Mosaic Deluge is universally admitted, and therefore we are compelled to refer it to the express and supernatural agency of Divine Power. "It is a waste of ingenuity,"—says Sharon Turner,—“to seek to account for it by natural causes; partial inundations may arise from local circumstances and partial operations of ordinary agencies; but no existing laws could produce an universal destruction, because the regular course of Nature is to continue as it is, and not to subvert itself. It is made to subsist and to be what we find it to be, and it looks like a contradiction which approaches an impossibility, that established laws and agencies can at the same time be both preserving and destroying. We may likewise say that if natural laws could then have produced an universal deluge, they would since have repeated the operation with reiterations like the cometary visitations; but the History of all nations attests, that since the existing records of human transactions began, no second general deluge has ever taken place. We therefore run no risk of error, in referring the stupendous incident to a supernatural cause, and that can only have been the will and appointment and exerted power of that Being Who alone can

create and destroy; Who would never suffer agents to abolish what He meant to continue; by Whose Omnipotence either event is equally producible, but Who never causes anything to perish without adequate reasons and for beneficial results."\*

Some, however, who are averse to miracles or supernatural agency, have suggested that certain natural laws may have existed before the Flood, by means of which the waters were forced from their proper beds to overwhelm the Earth; but they have unaccountably overlooked the fact, that if such laws ever had existence, a miracle must have been resorted to in order to remove them; for we are assured that a deluge shall never again devastate the Earth. It is certain therefore that a miracle must have been resorted to, either to produce the Deluge or to remove the laws which caused it; and thus since the Almighty willed that a general deluge should take place; and since we have already seen that by producing simultaneous elevations and subsidences on the surface of the Earth, the water was drawn off, in order to give origin to the dry land; so we may be permitted to suggest, that the miracle consisted in causing a counter volcanic movement to commence, which, by elevating the antipodal sea bed, would both expel the waters and cause the moun-

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\* Sacred History of the World, Vol. II., p. 202.

tains on the opposite side, to resink or subside; and thus literally "break up" the fountains or depths of the great abyss, which, together with the waters falling in torrents from the clouds, would again entomb, or overwhelm the Earth, as in the time previous to the first separation of land and sea.

An objection may arise to this mode of producing a deluge, from the circumstance of the historian asserting that "all the high hills, that were under the whole Heaven, were covered; fifteen cubits upward did the waters prevail; and the mountains were covered;" whereas by the method here proposed there were actually no mountains to cover. If, however, we admit, what some geological facts would render probable, that only a portion of the then existing intertropical mountains were depressed,—the tops of those inferior elevations which were still left in various parts of the world, may have been covered as Moses relates. This indeed becomes the more probable, since we are not told that the waters of the Deluge were as deep as those which formerly enveloped the Earth,—but rather that *they were not so deep*, for we read in the second verse of the eighth chapter of Genesis, that, "the fountains also of the deep and the windows of Heaven *were stopped*, and the rain from Heaven *was restrained*"; which clearly implies that neither the one nor the other

*was yet exhausted.* Now bearing in mind the testimony borne by our best geologists to the fact of repeated subsidence and diminution of land during the period in which the wealden beds were formed,—we find a most remarkable confirmation of our views recorded in the “very curious and interesting work, called the book of Enoch, referred to by St. Jude at verse 14; a work, which had long been looked upon as lost; but which was at length discovered in the Ethiopian language by Bruce in Abyssinia, who brought home three manuscript copies of it, one of which was presented to the Royal Library at Paris,—a second to the Bodleian Library at Oxford,—and the third retained by himself. In the 82nd chapter of this book at the fifth verse we find the writer prophetically describing the destruction of the Earth in the following manner; ‘and falling to the Earth, I saw likewise the *Earth* absorbed by a great abyss and mountains suspended over mountains,—hills were sinking upon hills,—lofty trees were gliding off their trunks and were in the act of being projected, and of sinking into the abyss. Being alarmed at these things, my voice faltered,—I cried and said the Earth is destroyed. Then my grandfather, Malalel, raised me up and said to me, why dost thou thus cry out, my son? and wherefore dost thou thus lament? I related to him the whole vision I had seen,—He said to me,—confirmed is

that which thou hast seen, my son. And potent the vision of thy dream, respecting every secret sin of the Earth. *Its substance shall sink into the abyss*, and a great destruction take place. Now my son, rise up; and beseech the Lord of Glory (for thou art faithful) that a remnant may be left upon the Earth, and that he would not wholly destroy it. My son, all this calamity upon Earth, *comes down from Heaven*, upon the Earth shall there be a great destruction.' ”\*

In this remarkable passage, we not only see a distinct declaration that “this calamity upon Earth should come down from Heaven,” or be caused by supernatural means,—but likewise that the dry land should sink or subside into the waters, and thereby cause a great destruction. “Mountains suspended over mountains, and hills sinking upon hills,”—is truly descriptive of the effect we should look for in their depression; while the consequent *refilling* or *raising* of the hollow antipodal beds in which the seas were contained,—by expelling the waters and so breaking up the fountains or wells of the great deep, and again forcing them to rise upwards and envelop or deluge the sinking land, is well expressed in the declaration that “*the Earth was absorbed by a great abyss.*”

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\* Fairholme's Scripture Geology.

This vast and universal inundation was the cause of the destruction of every living thing that then moved upon the face of the Earth, with exception only of the few which God had commanded Noah to take with him into the Ark to keep seed alive upon the Earth when the waters should have again subsided.

The point of time in the history of the world, at which we have arrived when the wealden formation was deposited, whether in lakes or estuaries, is the termination of those 2,261 years, which, according to the researches of the best chronologists, elapsed between the fall of man, and the Mosaic Deluge. That visitation, we are told, was caused by the utter depravity of the human race, and it was sent to destroy mankind and all created things from off the face of the polluted Earth,—thus literally and substantially proving, in accordance with the opinions of geologists, “that with the secondary strata ended a certain general condition of the globe, and with the tertiaries commenced a totally new arrangement.”\*

We have gathered from the preceding inquiry, that through the agency of frequently recurring volcanic forces the condition of the primeval Earth had become changed from that of small islands scattered through a vast extent of seas, to one of

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\* Phillips' Treatise on Geology.



more extensive tracts of land situated chiefly in equatorial regions, and furnished with the plants and animals adapted to its climates, and that the occurrence of the highest mountains within these favoured regions tended, according to the views so ably developed by Mr. Lyell,\* to raise the temperature generally over the whole Globe. In some part of this intertropical Earth, mankind was certainly living, although the changes which have since occurred in the place of his abode, have in all probability rendered it impossible that we shall ever find his remains in any abundance, if at all.

Every consideration tends to render it probable that the first approach of the Deluge was gradual, and that the earliest intimation the rebellious race received of the infallible consequence of his depravity and of God's displeasure, consisted in the heavy rains which for forty days and nights continued to pour down upon the devoted Earth. Those who have witnessed the partial inundations consequent on a few days' heavy rain, and the destruction and devastation often caused thereby, may be able to form some just idea of the dreadful effects that would be produced by an unceasing torrent from the skies of forty days and forty nights. Towns, villages and the soil itself, with

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\* Principles of Geology.

all its productions, would be swept away before the rush of waters, as, swollen with the heavy rain and choked and impeded by accumulating debris, the streams and rivers overflowed their banks and swept wildly and irresistibly over the neighbouring lands. Nor must we overlook the fact that in all probability these heavy rains were accompanied, as is usual in tropical regions, by terrific thunder and lightning, and heavy gales of wind, uprooting and levelling whole forests, as they swept howling in furious and chilling gusts over the condemned and perishing Earth.

And where was man,—against whose rebellious and devoted race, the elements were thus let loose? Surprised, confounded by the conviction that the awful doom pronounced upon his head, one hundred and twenty years before, was now in truth about to be fulfilled,—guilty and horror-stricken, he would have fled before the invading flood, till overcome by fatigue, cold, hunger and despair, numbers would have perished in the whirling torrents sweeping onwards in pitiless fury. Some may have fled for safety to the mountain heights,—but all in vain; their misery would but be prolonged in contemplating the ever rising waters of the Flood, which at length having completely engulfed the plains, was rising even to the mountain's brow. What dreadful horrors must have been endured by these doomed and wretched people,

who now saw and too late acknowledged in the fruitlessness of all their efforts, and in the irresistible and appalling fury of the agents of destruction,—the finger of that awful Being, whose anger they had so long provoked. Yet still the windows of Heaven and the fountains of the deep continued, as the land now gradually subsided, to supply a never-ending stream, till the destruction was complete, and every mountain was covered, and every living thing was destroyed from off the face of the Earth. Truly must it have been a visitation of horror and despair to the guilty race. Man saw the folly of his ways too late to save him from the general doom,—yet not too late, it may be hoped, to show repentance for his crimes and receive forgiveness and acceptance for the sake of Him, who afterwards appeared to save the World.

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## CHAPTER XXV.

EFFECTS OF THE FORTY DAYS OF RAIN ; DEPOSITION OF THE PURBECK AND WEALDEN BEDS ; EFFECTS OF THE BREAKING UP OF THE FOUNTAINS OF THE GREAT DEEP ; VOLCANIC ACTION ; SUBSIDENCE OF LAND ; CHALK OF VOLCANIC ORIGIN ; RISE AND FALL OF THE DELUGE PROGRESSIVE ; TRANQUILLITY OF ITS OCCURRENCE REFUTED ; SUBSIDENCE OF THE WATERS AND RE-APPEARANCE OF DRY LAND.

WE have now in the rise of the diluvian ocean, two periods to consider; first, the operations of the "forty days and forty nights;" and secondly, the breaking up of the fountains of the great deep. In the first of these periods, it seems evident enough that we have only to picture to ourselves what would be the effects of such a continued scene of storm and strife in our own times in order to form a tolerably correct idea of what occurred at the commencement of the Deluge, and from the well known devastating powers of the minor and comparatively insignificant floods of the present day, we can easily persuade ourselves that the consequences must have been the destruction of the soils and produce of the land.\* Villages, towns and cities would have been swept away;

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\* See Sir T. Dick Lauder's Account of the Moray Floods, *passim*.

and the cultivation and the forest would alike have bent before the strife of winds and waves, and left no trace behind save that of ruin and desolation; the humblest living creature and proud rebellious man himself, would alike have perished in the war of elements. Thus the swollen and rising rivers of the land, would at first have carried down the soils and rounded stones and the broken and uprooted vegetation which the commencing storm had strewed about,—to be again deposited in lakes or in estuaries of the sea, above the Oolitic series, giving rise to the “dirt-beds,” and fresh-water strata of the purbeck beds, containing the roots and trunks of the trees brought down. But as the strife on land increased and the waters gathered strength and fury from the long continued rain, the wealden strata of “clays and sands, limestone and grit and shale, containing fresh-water shells, terrestrial plants, and the teeth and bones of reptiles and fishes manifesting that they had been subject to the action of river currents,”\* would have succeeded; while the waves of the ocean, lashed into fury by the raging winds, would have mingled some estuary species with the detritus of the land. But, now, the co-operation of another agent more powerful still than either wind or rain, was called in to

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\* Mantell's Geology of the S. E. of England.

break up the fountains of the deep, and complete the destruction of the land and its productions. The volcanos of the deep again burst forth, diffusing their noxious gases and lava streams into the wide area of the seas,—poisoning and destroying the living things within their influence, and pouring forth vast currents of cretaceous matter from their subterranean stores,—while the shattered and trembling land subsided mass after mass, as internal resistance ceased, into the surrounding seas; and thus literally fulfilled the prediction that “the Earth should be swallowed by a great abyss.” Thus according to the theory herein proposed, if the greatest extent of land and the highest mountains occurred in intertropical regions, the subsidence of those lands and mountains, together with subsidences in some other regions, by expelling the antipodal waters from “the fountains or wells of the abyss,” would have caused the ocean to encroach gradually upon the land until at length the summits of the remaining inferior mountains of other or extra-tropical regions, would have been likewise submerged, and thus “all the high hills,” that remained, “under the whole Heaven, were covered.”

Nor is the production of chalk by such means as we have here proposed, at all opposed to probability, for Bakewell records an instance of the kind which took place in Sicily in 1777, when the

volcano of Mecaluba poured forth a column of mud, succeeded by "several streams of liquid chalk."\* Add to such facts as this the decomposition of the marine fluid, and the destruction and dissolution of the vast coral fields of the antediluvian seas through which the volcanic outbursts may have passed, and we may perhaps satisfactorily account for the chalk of the present day being so thickly loaded with marine exuviae.

There is abundant evidence in the Scripture narrative to prove that the rise and fall of the Deluge were gradual, and therefore we should by no means be justified in supposing that at the termination of the forty days of rain,—the fountains of the deep were all suddenly and simultaneously broken up,—but rather that successive subsidences of land from time to time took place, as the phenomena of geology prove to have been the case,—each subsidence causing an increase or rise of the waters upon the land;—and this is fully borne out by the statements, first, that "the flood was forty days upon the Earth; and the waters increased and bare up the Ark, and it was lift up above the Earth;" secondly, that "the waters prevailed, and were increased greatly upon the Earth; and the Ark went upon the face of the waters;" and thirdly, that "the waters

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\* Bakewell's Introduction to Geology.

prevailed exceedingly upon the Earth; and all the high hills, that were under the whole Heaven, were covered." In these several statements the gradual rise of the waters is marked by the fact that the Ark was first *lifted up from the Earth*,—then that the waters *increased greatly*, and the Ark freely floated on the surface; and lastly, that the waters *prevailed exceedingly* until the mountains were covered; each statement increasing in strength until the submersion of the Earth was accomplished. So, in like manner, is the gradual subsidence of the waters recorded; but the statement in this case has evidently sole reference to the country in which the Ark grounded, and the present continents of Europe and other parts of the world may therefore have been long submerged even after the more eastern lands were laid bare; but it seems unreasonable to suppose, as many writers have done, that the rise and fall of the Deluge were so extremely tranquil and unaccompanied by violence that it tended little to effect a change in the previous condition of the Earth's surface, and that the vegetation was left uninjured; for they seem entirely to have overlooked the fact, that whether partial or universal, the Deluge was called forth *expressly to destroy*, and that consequently it was a period of devastation and convulsion, a fact sufficiently attested by the indications of subsidences of land



during the accumulation of the wealden and the chalk, as well as by the after evidences of the uprise of land when those deposits had been completed. Neither must it be overlooked that little of the then existing dry lands remains to record the violence that occurred. But if the Scriptural Deluge is to be considered as an actual fact, and we are to believe that it was ordained, no matter whether locally or universally, to destroy every organic substance together with that Earth on which the sin had been committed, then does it amount to an absolute impossibility, that the olive tree, which is so triumphantly cited by various authors as a proof of tranquillity,—could have escaped the destruction which was entailed upon every created thing, and remained uninjured, as if in defiance alike of that Deluge and of the wrath of Him who sent it; for if the supposition of geologists be *correct* and that tree escaped destruction,—then is the Bible *incorrect*, and its statements that “all in whose nostrils was the breath of life, perished, *together with the Earth*,”—must be regarded as purely fabulous! But is there much, we would ask, which savours of tranquillity, to be gathered from the vision of Enoch? “Mountains sinking upon mountains,—hills upon hills, and trees gliding from their bases into the abyss,” are circumstances which denote any thing but a tranquil state. Neither is much of gentleness

expressed in the words of the Psalmist, when referring to the subsidence of the Deluge, namely, —“the waters stood above the mountains. At thy rebuke they fled; at the voice of thy thunder they hasted away. They go up by the mountains; they go down by the valleys unto the place which thou hast founded for them.” Surely there never was a description more unadapted to a state of tranquillity than this? The thunder,—the uprising of the mountains, and the violent down-rush of the retiring waters, present a scene rather of terrific violence and convulsion, and one moreover that is strictly in accordance with the events of this period, as registered in the strata of the Earth.

A learned author, the Revd. Pye Smith, arguing for the local occurrence of the Deluge, informs us that “there are trees of the most astonishing magnificence as to form and size, which grow, the one species in Africa, the other in the southern part of North America. There are also methods of ascertaining the age of trees of the class to which they belong, with satisfaction generally, but with full evidence after they have passed the early stages of their growth. Individuals of these species now existing are proved, by these methods, to have begun to grow at an epoch long before the date of the Deluge: if we even adopt the largest chronology that

learned men have proposed. Had those trees been covered with water for three quarters of a year, they must have been destroyed; the most certain conditions of vegetable nature, for the class, (the most perfect land plants) to which they belong, put such a result out of doubt. Here then we are met by another independent proof, that the Deluge did not extend to those regions of the Earth.”\*

Now the *proof* here afforded, is not,—of the local nature of the Deluge,—but, of the author’s misconception of “the true meaning of the Scriptures.”†

The Deluge either did, or did not, occur;—if it did, and the Bible be the word of God,—then must it have happened as therein recorded,—and consequently as “all the high hills, which *were under the whole Heaven, were covered,*” it is positively asserted that the Deluge was universal. That the trees alluded to, could not have lived beneath the waters for three quarters of a year, is also equally certain; they must consequently have sprung up after the waters subsided, and like the olive tree abovementioned, were *original creations* of species which had not heretofore existed, and *were produced in full maturity of structure,*

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\* Revd. Pye Smith, on Scripture and Geology, p. 159.

† Phillips’ Treatise on Geology.

that is, *of an age*, as we should say,—or *at a stage of growth*, which rendered them at once capable of bearing fruit and so of propagating their species.\*

Thus after the destruction of all organic beings had been completed, and the Flood had prevailed upon the Earth an hundred and fifty days, it pleased the Almighty to remember Noah and to cause the water to retire from off the land. We gather from the description of the subsidence of the Deluge that the re-appearance of dry land was slow and gradual, and we may reasonably suppose that the means by which its emergence was effected, were similar to those which gave it birth on the third creative day, and which ever since that period had continued to exercise so powerful an influence over its distribution and extent. No sooner then had the mandate gone forth for the waters to abate, than range after range and land after land began gradually to emerge in succession, until the ocean had once more retired into those places which were appointed to receive it. But that the present distribution of land has been slowly and gradually effected, is proved by geological phenomena which teach us that some of the mountains of our time have attained their present elevation

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\* For further proof see forward, Chapter XXX.

only since the deposition of some of the tertiary strata commenced, and because the northern lands are not only still on the increase, but have continued so to do ever since the commencement of the tertiary era.\*

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\* Lyell's Principles of Geology.

## CHAPTER XXVI.

SUPPOSED CHANGE OF PLACE BETWEEN LAND AND SEA ; ALLEGED SCRIPTURAL PROOFS ; PROVED ERRONEOUS ; PENN'S VIEWS ; LAND EXISTED IN THE NORTHERN HEMISPHERE PREVIOUS TO THE DELUGE ; SUPPOSED TRANSPORT OF ANIMALS FROM TROPICAL TO NORTHERN REGIONS ; PROVED TO BE IMPOSSIBLE ; PENN'S ERRONEOUS VIEWS REGARDING THE CURSE ; NOT REMOVED BY THE DELUGE ; THE DELUGE A SECOND CURSE ; THE FIRST EARTH HAS NOT YET PASSED AWAY.

It is usual among those who possess but a limited knowledge of geology, to point triumphantly to the vast quantity of the remains of terrestrial animals which is found imbedded both in "the drift," and in the tertiary formations, as affording positive and conclusive evidence of the effects of the Mosaic Deluge,—while at the same time the occurrence of the secondary strata beneath these beds, and containing numbers of marine shells and other exuvia, in such profusion as sometimes to constitute nearly the entire rock in which they are found, has given rise to an opinion that the sea which formerly stood for a long term of years over what are now the continents of the present Earth, was at length by some severe convulsion caused to retire, while the bottom or bed of that sea became

converted into the existing dry land, as the former land became the bottom of the present sea. It has been asserted even, that proof of such an occurrence exists in the record of the Scriptures, wherein it is declared that "the world which then was, being overflowed with waters, perished;" from which passage Mr. Penn has endeavoured to establish a theory, that the former Earth was depressed at the Deluge, in order to form a new bed for the sea, and he then proceeds to show that the reflux of the waters in their descent, would have swept the animal remains from off the depressed Earth to deposit them again over the bed which they were leaving, and thus he proposes to account for our finding terrestrial animals entombed in the tertiary strata which overlie those containing marine productions. He is, however, compelled to the adoption of this opinion, from his having entirely overlooked the proper period of the first recorded revolution; and thus he is obliged to refer the fossils of the secondary and tertiary beds alike to the same epoch.

A reference to Figs. 2 and 3 will be sufficient to show that the Earth being solid, no such depression could possibly have occurred, unless an eruption of matter from the centre, attended by an uprise of the superficial strata in some other direction had likewise taken place,—and consequently that neither could *a reflux*, such as that assumed

by Mr. Penn, have been so produced,—nor could terrestrial animals have been brought from former tropical lands, into the northern regions, where the tertiaries which contain them are found;—but they must have lived and died in or near the situations where their remains are now buried.

Insisting that the Scriptures mention only two periods of revolution,—and declaring the separation of land and sea, on the third day, to have been the first of them, our author consequently leaves only his second revolution or deluge to account for the inhumation of *all fossil exuviae*, both terrestrial and marine, because his first revolution, as already shown, was completed before the creation of any organized beings. The words quoted from St. Peter, that “*the world* which then was, being overflowed with waters, perished,” seem by no means intended to convey any actual change of places between land and sea, but to refer simply to the fact that a deluge having passed over *the then Earth*,—caused all within—or upon it, to perish,—or may still more probably be intended to inform us that *the then inhabited portion* of the world, perished by subsidence, and consequently no longer exists.

Mr. Penn, however, not appearing rightly to understand the import of the threat,—“I will *destroy* them (*i. e.*, all flesh) *together with the Earth* ;” and being entirely misled by his views



of the first revolution,—founds upon this sentence, his theory of an entire change of place between land and sea,—or, in other words, that *our present dry land* was the bed of *the antediluvian ocean*. Nor can it reasonably be urged that the marine character of the strata on which we now dwell, furnishes evidence of the truth of such change, for although undoubtedly many parts of our present dry land have been reclaimed from the bosom of the waters, this fact by no means warrants the assumption that *the whole* of it has been so derived;—for we have positive evidence in the occurrence of our coal fields and in the perfect state of preservation of the delicate leaves of the plants which contributed to the production of that mineral, that land formerly existed in the immediate vicinity of such deposits, and therefore, although it may now be impossible to point out with any certainty what portion of the present mountains were then in being,—it is yet quite evident that some dry land existed in antediluvian times in the regions where it likewise now prevails, and this not only in Europe, but also in America,—Central and Eastern Asia,—Australia, and in short wherever the coal is found.

Again, another argument is furnished by the author's account of the probable manner in which the bodies of the animals destroyed, were carried back by the supposed reflux of the waves, from the

places where they died to the land we now inhabit. "Let us suppose,"—he says,—“that the eastern coast of America were to yield to the sea, by successive subsidences of its land, yet leaving after each subsidence a new resisting coast sufficient to repel the waves; the reflux must still be the same as if the continent remained entire; and the retiring current must equally make its way back to the coasts of Africa and Europe.” Granting this, we have still to learn whence was the land which could so have yielded to the sea? The example furnished by the coast of America is really nothing whatever to the purpose, since that continent is dry land raised above the waters,—and therefore capable by its resistance to the superficial waves of the sea, of producing a reflux,—but at the time when Mr. Penn’s *imaginary reflux* took place, the entire Globe was submerged beneath the ocean, and no resisting coast existed to produce the desired effect.

The exuviæ which are found in northern latitudes are chiefly those of genera which are now extinct or only living in tropical countries, and it is therefore an utter impossibility that they could have been transported *entire* from those scorching climates where decomposition commences immediately after death,—to the now frozen regions of Siberia; yet according to Mr. Penn’s views they must have withstood decay for a much longer

period than is now found to be the case, even in our reduced temperatures, for he says they were brought to these countries by the "reflux of the ocean when the waters were descending again into the place appointed to receive them, that is, when they began to be transfused from their proper beds over the former Earth," and which transfusion causing,—be it observed,—the reflux by which *tropical animals* were carried to the regions of *the north*,—did not begin until "one hundred and fifty days or *five months* from the commencement of the flood;" that is, *five months after their destruction!* Truly those waters must have been endowed with great anti-septic powers, to enable them to preserve entire and free from putrefaction during the period of five months, and afterwards to leave enclosed in the icefields of Siberia, such huge masses of flesh as the carcasses of the elephant and rhinoceros!\* He tells us that "the record points out *the period* when the waters, having diffused themselves *a second time* over the globular surface by the subsidence of the former continents, *began to abandon their ancient bed*; from which they continued to *descend*, until they left it *a dry land* as the former *Earth* had been rendered a *dry land* by the retirement of the waters. *That period was at the end of*

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\* See Account of Siberian Mammoth—Cuvier, Lyell, Ansted, &c.

*one hundred and fifty days, or five months from the commencement of the Flood.”\**

Now, unfortunately for Mr. Penn's theory, it so happens that existing geological facts furnish undoubted evidence that no transport from tropical to northern regions could possibly have occurred,—but on the contrary, there are strong indications that the diluvial currents which deposited the detritus in which bones of terrestrial animals are found, must have passed *from the regions of the latter*, towards the former; a circumstance which goes far to prove that had the old Earth been depressed for the reception of the waters, we ought now to find the exuviæ of northern animals imbedded in the strata of the tropics, or to seek them beneath the bosom of the present sea. Had the waves of the diluvian ocean met with a steady and slowly yielding barrier to their advance, such as we see in the coast of the western continent, doubtless the reflux might in some trifling measure have had the effect ascribed to it; but as they were *propelled* according to the showing of our author, into a *new bed purposely depressed for their reception*, it becomes evident that *no steady barrier* existed to impede their progress, and thus *no reflux* of sufficient power to effect the supposed transportation of animal bodies, would have been

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\* Penn's Comparative Estimate, p. 268.

formed. For if occasional impediments had been met with in the alleged transfusion, still, as the former old Earth had been *depressed below the level of the former ocean*, those animal remains which might have been washed off by the reflux, would never have had time to reach the northern portions of our present Earth, but would again have been swept downwards with the retreating waters, into the bed depressed for their reception,—because in consequence of such depression, *a strong and irresistible current must have set in from the former ocean*, and thus if land and water really did change places, the exuviæ of the animals of those days must now lie buried in the present sea. It is apparent likewise from Mr. Penn's own reasoning, that no obstacles whatever could possibly have been opposed to the waters in order to produce a reflux, for he tells us that it was "one hundred and fifty days or five months from the commencement of the Flood, that the waters began to abandon their ancient bed from which they continued *to descend* until they had left it a dry land."\* Now, it must be borne in mind that the waters are here supposed to be standing equally deep over all the Globe, so that the Earth must have been in the centre, and according to Mr. Penn, that portion which had

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\* Penn's Comparative Estimate, p. 270.

formerly been the dry land was depressed for the reception of the waters in order to cause the subsidence of the flood. Is it not then evident that these waters would at once have sunk down from their equal height into the hollow beneath them? and is it not equally manifest that the formation of a long continuing reflux *to carry upwards* the terrestrial exuviæ into that portion from which the waters were rapidly and irresistibly descending, would have been utterly impracticable and impossible? But it has been likewise suggested that “had the former continents sunk *all at once*, the immediate and violent influx of the great body of the ocean to fill *the vacuum* thereby created, must have hurried the Ark into its enormous vortex, and have caused it to be presently engulfed; whereas the Record represents the Ark, like an ordinary vessel riding securely upon the surface of the ocean.” Let us concede therefore that,—“the transfer of the waters was gradual and progressive, like that of the waters of *a lock*, in which a vessel descends imperceptibly from a higher to a lower level; which implies gradual and successive subsidences of the water.” The more gradual the subsidence, the more apparent does it become that the production of the desired reflux by such means could not have been effected,—for the successive depression in the mineral mass, would but have caused the successive subsidence of the water, not

only without producing any reflux whatever, but also without rendering any dry land visible, unless, which is likewise an impossibility, a depression could have been produced capable of containing in its bosom, the whole of the waters of the ocean.

There appears, indeed, throughout these statements to be a degree of error and contradiction, more than sufficient to destroy the whole argument, for in the first place we have the depression of the former land, and the consequent influx of the former ocean to produce the Deluge and destroy "all flesh,"—and yet we are told that the period when the waters "*began to abandon their ancient bed,*"—was at the end of "*one hundred and fifty days or five months* from the commencement of the Flood;"—or, in other words, that the Deluge *began* five months *after its commencement*, and having allowed terrestrial animals to putrify and decompose beneath its waters during those five months,—it then by a reflux *restored and transported them from* the tropics to the regions of the north, and finally left them *entire* to be afterwards encased in the icebergs of Siberia!—All this is remarkably absurd,—and yet it is in reality the substance of our author's theory.

"The first great difficulty,"—he says,—"*which the mineral geology has created for itself, occurs in that amazing and principal phenomenon, the remains of animals of all species and climates*

which are discovered in exhaustless quantities in the interior of the Earth; so that the exuviæ of animal species now subsisting only *within* the torrid zone, and those of species which *no longer exist at all*, are found confusedly huddled together in the soils of the *most northerly latitudes.*" Pursuing the subject, he observes,—“the mineral geology, contemplating these relics and reflecting upon the *places* in which they are found, immediately demands *a revolution* different and distinct from either of those intimated by Moses, in order to account for their *presence* in the places where they now lie. But why does it need that *other revolution*? Solely because it reasons thus upon the evidence before it; these exuviæ of equatorial animals *are found* in northern latitudes; therefore their ancient owners must *have died* in those latitudes; therefore they must have *lived in those latitudes!* And yet they could not have *lived* in those latitudes unless a revolution has taken place either in the *nature of the species* or in the *climates of the Earth.* But no such revolution is shown in the Mosaical record or can accord with its recital, therefore *other revolutions* in one or the other of these must be *assumed* to supply the chasm in the Mosaical record. Thus it reasons in perversion of all logic and in exclusion of the true explication of the phenomenon.”\*

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\* Penn's Comparative Estimate, p. 307, *et seq.*



Thus mistaking the true period assigned by the Mosaic record for the first great change which the temperature of the Earth's climates has undoubtedly experienced, and twisting the operations and events of the third creative day, *previous to the existence* of the animal and vegetable classes, into *a revolution*, Mr. Penn is of necessity obliged to refer the whole of the fossil exuvia of our strata to the period of the Deluge, and thus we are enabled to fathom his great anxiety to make the land and sea change places. The strictest and most literal reading of the text by no means warrants this conclusion, but, on the contrary, it is clearly pointed out that there were *two periods of general destruction* subsequent to the creation of organic beings.

But let us follow the author through his argument of the total destruction of the former Earth; "such,"—he informs us,—“being the consentient understanding of all the principal Hebrew authorities, it establishes the term of the threat to signify the *destruction not only of man and of all the animals which co-existed with him, but likewise of the Earth itself which they had hitherto inhabited*. Nor ought this interpretation to embarrass or in any way to surprise us; for let us remember that the *Earth* had received the *curse of God* from the moment of the first act of disobedience committed upon it; and ‘*that which is*

*cursed of Him shall be cut off,*' for it is to be noticed that the curse was not pronounced upon *man*, but upon the *Earth* on his account. And although its productions were immediately affected, yet the full consequence of the curse does not appear to have been limited to that immediate and actual affection. Even at the birth of Noah that malediction seems to have carried forward the minds of the pious to *some crisis* by which it was to be terminated. On that occasion his father was led (no doubt by some inspired warning) to exclaim, 'This child shall comfort *us* concerning our work and toil of our hands, *because of the Earth which the Lord hath cursed;*' in which word '*us*,' we are not to understand *themselves personally*, but their race. And after the retreat of the waters of the Deluge, God did not *revoke* the curse which he had formerly pronounced, because it had been fully executed in 'cutting off the cursed thing;' but He declared, that He would not again pronounce a curse, *i. e.*, pronounce a *second curse* upon the Earth; that is, upon the *new Earth* which He had provided to succeed that which had been cursed and cut off; '*ου προσθησω επι καταρασθαι την γην, non addam maledicere rursus terram;*' which implies that the curse was terminated by the Deluge."\* It is here rendered fully apparent that this writer's

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\* Penn's Comparative Estimate, p. 256.

anxious desire to overthrow the theories of the mineral geologists, and to establish his own views with regard to the entire change of places between land and sea, has somewhat unguardedly hurried him into a total misapprehension of the inspired exclamation of Lamech at the birth of Noah. From the passages already quoted it will be seen that Mr. Penn very erroneously considers the curse which was pronounced upon the Earth at the fall of our First Parents, to have been *fulfilled* by the destructive visitation of the Deluge, and he reminds us that the curse was pronounced *not upon man*, but upon the *Earth* on man's account, and he quotes from the Scriptures in proof of the soundness of his views, that "that which is cursed of God shall be cut off." This amiable and evidently well-intentioned writer, possessing no knowledge of geology, and totally mistaking the true period assigned by the inspired historian for the first revolution, has necessarily been betrayed into inexcusable errors;—and he passes over, with but a slight allusion to it, the fact that the curse pronounced upon the *Earth* immediately began to operate by rendering it less fruitful and productive than it had hitherto been,—as is clearly shown in the words of the record, namely, "because thou hast hearkened unto the voice of thy wife, and hast eaten of the tree, of which I commanded thee, saying, Thou shalt not eat of it: cursed is

the ground for thy sake; in sorrow shalt thou eat of it *all the days of thy life*; thorns also and thistles shall it bring forth to thee; and thou shalt eat the herb of the field; *in the sweat of thy face shalt thou eat bread, till thou return unto the ground*; for out of it wast thou taken: for dust thou art and unto dust shalt thou return.”\*

The effects of this *first curse* were at once felt, and the Earth, which had hitherto yielded her riches to man without toil and labour, now became unfruitful unless tilled and cultivated. This curse was *the cause* of the first great revolution and reduction in the temperature of climates, and it was in mercy to the human race at once carried into effect. We say, *in mercy* to the human race, because man had by his transgression rendered himself mortal. It was therefore clearly an act of the greatest mercy in the Almighty to render the Earth less lovely and attractive to the fallen race, and thus, not only lessen the regrets they would otherwise have felt at being obliged to leave so beautiful a world, but also teach them to look up with hope, from the pains and sorrows of this life, to Him, by whom alone those pains could be relieved. But it must be remembered also, that the curse was entailed upon the Earth in consequence of man having rendered himself mortal,—

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\* Genesis iii. 17, 18, 19.

and *therefore* it must remain upon it, so long as he, for whose sake it was cursed, shall retain his mortality; consequently it could not have been fulfilled by the Deluge, but remains yet in force as is sufficiently proved, one would think, by the fact that man still eats his bread by the toil and labour of his hands and in the sweat of his face, and is obliged to till and cultivate the ground, which otherwise yields him nought but weeds.

How such a palpable and glaring oversight, as this, could possibly have occurred to a writer of Mr. Penn's critical acumen, it is indeed difficult to imagine, for it would almost seem as if he had wilfully shut his eyes to the facts of the case; how else could he have misunderstood the passage, "cursed is the ground *for thy sake*; in sorrow shalt thou eat of it *all the days of thy life*." Could he possibly be unaware of the fact that man still eats his bread in sorrow and in the sweat of his brow?

With regard to man, the dreadful after-consequences of mortality, which, by his disobedience he has brought upon himself, *are to be remitted only* through faith in Him who took our nature upon Himself, and died that He might purchase and redeem us with His blood, *from the punishment to come*. And assuredly *to this* Blessed Redeemer,—and not to the visitation of *the Deluge*,—the inspired exclamation of Lamech, at the birth of Noah, had reference; for as yet *no threat* of des-

truction had been launched against the Earth and its inhabitants, nor was it pronounced until *five hundred years afterwards!* for we read in Genesis that Noah was *six hundred years* old, when the Flood was upon the Earth, and we know that *the warning threat* was given about *one hundred and twenty years* before the Deluge actually began; consequently Noah was born nearly five hundred years before the warning threat was given. Thus it would appear that the exclamation of Lamech pointed out that *through Noah* and his posterity, a Saviour would arise to redeem and “comfort us concerning our work, and toil of our hands, because of the ground which the Lord *hath cursed.*” The words “*hath cursed*” distinctly prove that the exclamation pointed to that curse which man had already entailed upon the Earth and himself, by his first transgression, and not to the curse of the Deluge, for as yet *that threat* had not been uttered.

Now the Deluge was the fulfilment, not of the curse, but *of the threat.* It was therefore *a fresh* outpouring of the wrath of God, upon the Earth and its inhabitants, both human and animal, caused by the increased depravity and crimes of mankind; and although the historian does not *term* the threat *a curse*, yet we see by its consequences that it was such; and all doubt upon the subject is set at rest by the Almighty’s promise to Noah after the Flood;— “I will not *again curse* the ground

any more for man's sake; for the imagination of man's heart is evil from his youth; neither will I again smite any more every living thing, as I have done. While the Earth remaineth, seed time and harvest, and cold and heat, and summer and winter, and day and night shall not cease."\* This passage clearly implies that the Deluge was considered a curse by God himself, and therefore we see that a *second curse* had been brought upon the Earth for man's sake; consequently this second curse and not that originally pronounced to Adam, was the cause of the Deluge; and thus it is evident that the exclamation of Lamech points to our redemption by Christ as a means by which we are to be relieved from the consequences of the Fall, and had no reference to the destruction of the Earth by the Deluge, as supposed by Mr. Penn, who has somewhat unauthorisedly assumed the passage "I will not again curse the ground,"—to signify that God had as yet only pronounced *one curse* upon the Earth, and that it contains a promise not to inflict a *second curse*. The word "again" would have been equally applicable had half a dozen curses been pronounced, although Mr. Penn would arbitrarily restrict its meaning to a second curse only.

Thus then we perceive that two distinct curses have been imposed upon our Earth, and that

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\* Genesis viii. 21, 22.

each, as a consequence, has brought about a revolution. Both of these are recorded in the pages of Holy Writ. The first was pronounced at the Fall of Man and immediately operated in reducing the temperature of climates, by which the Earth was rendered less fruitful and by which numerous species of animals and plants became extinct. The second was drawn down by the utter depravity of the human race about two thousand two hundred and sixty years later, and produced the Deluge, by which the temperature of climates was still further reduced and all the organic productions of the land were destroyed.

Yet one more argument against the entire destruction of the early lands,—and we may then dismiss the subject. Mr. Penn affirms that the Hebrews understood the *destruction* of the Earth, and that St. Peter confirms their traditions by adverting in his second epistle, to the catastrophe of the Deluge, “expressly stating that *the world which then was being overflowed with waters, perished* ;” to which “world which then was,”—he opposes,—“*the Earth which now is*,”—and he proceeds to declare that the Earth which “*now is*,”—is reserved for destruction *by fire*,—as the Earth which “*then was*,” sustained destruction *by water*. He thus enables us to judge of the extent of the destruction of the former, by affirming the destruction of *both* to be equal and therefore rendering them *rules* for



mutually explaining each other. *Of the latter* we are apprized that its destruction *by fire* will be final; and *we* are therefore in consistency to infer of the *former* that its destruction *by water* was also final; the instruments of destruction are different, but *their effects* are co-extensive according to the diversity of their natures. So that the sense in which the old interpreters understood the words, namely, “*and*” or “*with the Earth*” is thus both expounded and confirmed by the highest authority in the Christian Church.”\*

Now it will be as easy to give a different,—and, we trust, a more correct meaning to these words of St. Peter,—as it was to extract the true import of the inspired exclamation of Lamech at the birth of Noah. That “the world which then was, being overflowed with water, perished,”—cannot be doubted any more than that “the Earth which now is,”—will assuredly perish by fire; but it has been truly remarked that “a careful consideration of the Apostle’s argument will prove that instead of this being a *parallelism*, it is a most forcible *contrast*. It was not the “Earth” which perished, but the “world”—a word generally used for *the inhabitants* of the Earth.” The Earth itself remained, but its surface being “overflowed with water,”—the world or the inhabitants of the Earth “perish-

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\* Penn’s Comparative Estimate.

ed.”\* Yet we cannot further agree with this author that when “Noah came out of the Ark, he found all things ‘consisting’ as before—the rivers retiring into their original channels—the mountains and hills standing as before, each in his own place—the valleys again inviting the plough of the husbandman, and the productions of the Earth ready to yield support to the beasts and birds which had been long imprisoned in the Ark for this purpose,”—for such would have been not only in opposition to the declarations of Enoch and the Psalmist, but under all the circumstances impossible,—unless we are to understand,—which is evidently not the author’s intention,—that the productions of the Earth were entirely new creations;—it being contrary to the nature of terrestrial vegetation, that it could have existed beneath the waters during three-quarters of a year. Moreover, “the simple object of the Deluge,”—was not, as he asserts,—“the destruction of animal life,” alone,—but of “all flesh *together with the Earth*,”—which destruction of the Earth, however, is clearly limited to its soils and vegetation,—because by the laws of astronomy, if this planet, the Earth, had been destroyed according to the full signification of the word,—the whole system must have perished likewise. “But,”—saith the Apostle, as introducing a surprising and

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\* The Second Advent, by Revd. F. Close, p. 58, *et seq.*

wonderful contrast,—“the Heavens and the Earth which are now,”—not the *world*—he drops that term and never uses it again,—not the world and its inhabitants—not the teeming animal life on the surface of the Earth—but “the Heavens,”—the atmosphere, “the Heavens and the *Earth*, by the same word—are kept in store, reserved unto fire against the day of judgment and perdition of ungodly men.” This alone were enough to mark a striking difference between the two events—the drowning of the inhabitants of the Earth in the one case, and the burning of the Earth itself in the other. “All these things shall be dissolved; and the Heavens, being on fire, shall be dissolved, and the elements shall melt with fervent heat.” After this “a new Heaven and a new Earth,” will appear in which will be established, the pure church or “heavenly Jerusalem.”

Thus as by man’s disobedience, the earthly Paradise in which he was first placed, was lost,—and subsequently effaced from our Earth by the changes consequent on the curse of an offended God;—so in the latter days, through the merits and atonement once offered for us by the Son of God, will a *final revolution* again restore to us, the blessings we have so justly forfeited. But again, if the first Earth had totally perished at the Deluge, it will necessarily follow, that this our present,—must be the *second Earth*; how then does St. John in the

21st chapter of the Book of Revelations, say,—  
 “and I saw a new Heaven and a new Earth : for *the first Heaven and the first Earth* were passed away ; and *there was no more sea ?*” This was the record of a vision of future events, and yet there is no distinction made between the antediluvian and the present Earth, from which a traditional sense of its total destruction can be gathered ; and yet had such an event occurred, St. John could not have failed to know it, and to consider “the Earth which now is,”—as a *second Earth* ; but from his coupling “*the first Heaven,*”—of which as yet there has been *no destruction*, with “*the first Earth,*”—it becomes evident that he considered *our present*, to be *identical* with the *antediluvian Earth* ; and again from his saying, that on the destruction of “*the first Earth,*”—there “*was no more sea,*”—we at once perceive that the first Earth *has not* yet passed away ;\* consequently Mr. Penn is again in error, and the destruction caused by the Deluge must be limited to the extent to which we have above received it.

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\* Herein too geologists may find a complete refutation of their theory that our Earth is formed out of “the wreck and ruins of a former world.”

## CHAPTER XXVII.

THE FOSSIL EXUVIÆ OF THE TERTIARY STRATA ARE THE REMAINS OF ANIMALS WHICH LIVED AND DIED IN THE SITUATIONS WHERE THEY OCCUR, SUBSEQUENT TO THE DELUGE; SOME FOSSILS OF THE ENGLISH LIAS AND MOUNTAIN LIMESTONE IDENTICAL WITH THOSE OF THE HIMALAYA; DISTRIBUTION OF LAND IN THE EARLY PERIODS; PROOFS OF HIGH TEMPERATURE; SUBSIDENCE OF EQUATORIAL LANDS; RE-APPEARANCE OF LAND IN NORTHERN REGIONS; DETERIORATION OF CLIMATE; DEPOSITION OF TERTIARY STRATA; THE NORTHERN LANDS INHABITED BY LARGE MAMMALIA; SUCCESSIVE VIOLENT CHANGES IN THE DISTRIBUTION OF THE RISING LANDS; SUCCESSIVE DESTRUCTION OF ANIMALS; THE OCCURRENCE OF THE REMAINS OF ELEPHANTS NOT NECESSARILY INDICATIVE OF HIGH TEMPERATURE.

THE actual occurrence of the Mosaic Deluge being established by the testimony of the vision of Enoch; the declaration of the inspired historian, and by the Psalmist; and confirmed both by the traditions of every nation and by the subsidences and subsequent elevations of the wealden and the cretaceous periods, it can scarcely be necessary to inquire whether the animal remains, imbedded in tertiary or supercretaceous deposits, are due to that event or not; yet as it appears to be a popular belief that such remains were accumulated by the con-

vulsions of that period, it may be useful to guard against such misconceptions by detailing shortly the means by which their destruction may have been effected.

It is the opinion of geologists, founded on careful and patient investigation, that these fossils are the remains of animals which lived and died in the countries where they are now found, at a time when the tertiary strata were in the course of deposition, and when the climates of the northern regions, although reduced from their former elevated temperature, were still of a far more tropical character than at present.

The strata of the transition and secondary formations exhibit in the nature of their fossil contents, undoubted evidence of a high temperature, which, as such formations are not confined to any one region, but appear to be generally distributed over the countries of the Earth, must have been nearly equally diffused over the entire Globe; for instance, fossils of the European lias are likewise known to occur in strata of that formation across the snowy ranges of the Himalaya, such as "*amphidesma rotundatum*;" "*ammonites walcottii*;" *A: communis*, and others very closely resembling, if not identical with, *A: heterophyllus*," "and *A: greenoughi*;" while the mountain limestone of the same region is characterized by the presence of "*goniatites cyclolobus*," a species like-

wise occurring in the same formation in Britain. The warmth of the countries which existed previous to the close of the secondary era is therefore established on the unerring evidence of the strictly tropical forms imbedded in the strata of the Earth.

Now, according to a theory propounded and well explained by Mr. Lyell, in his *Principles of Geology*,—it follows that “whenever a greater extent of highland is collected in the polar regions, the cold will augment; and the same result will be produced when there is more sea between or near the tropics; while, on the contrary, so often as the above conditions are reversed, the heat will be greater.” Attending to the evidence afforded by the organic remains of the antediluvian epochs, we have assumed in the foregoing pages, in accordance with these views, that the primeval lands and highest mountains were chiefly situated in equatorial regions, in a manner to banish nearly all signs of frost from the earth, and to raise the temperature of climates generally over the whole Globe, and that in some part of these lands mankind was certainly living. Land likewise may have been, and indeed no doubt was, scattered in the form of islands through the northern seas, and which, although probably not inhabited by the human race and the higher orders of mammalia, were tenanted by terrestrial forms of vegetation and of reptiles.

The secondary era, which closed according to our views with the deposition of the Portland oolitic beds, was succeeded by the diluvial period, in which the fresh-water strata of the wealden, and the marine cretaceous system were produced, and it is to this particular point of time, through the subsidences which the wealden proves to have taken place, that we would refer the breaking up of the fountains of the great deep, when the whole of the land, whether insular or continental, was again submerged beneath the ocean; and when the equatorial lands inhabited by man, subsided altogether; or, in other words, as the gradual uprise of those lands had originally caused the waters to retire into the hollow beds to which the movement had given rise, so their subsidence, by raising the bottom of the antipodal seas, once more expelled the waters from their retreats, to rise over and engulf the Earth, agreeably to the terms of that prophecy which declared that the Earth should be "swallowed by a great abyss." After those waters had continued to prevail upon the remaining lands for several months, the mandate once more went forth, that they should again retire gradually into their appointed beds, and consequently a succession of volcanic movements once more began to upraise the land in various quarters of the Globe, and to draw off the waters into the antipodal subsidences. But this second



curse was destined still further to deteriorate the condition of man's abode, and the distribution of the land was therefore now entirely changed, for whereas it had previously existed chiefly in equatorial regions and had contributed thereby to render climates wholly tropical, it now became distributed in northern latitudes, and tended, by the towering elevation of its stupendous mountains, to produce a considerable decrease and variety in the temperature, requiring a corresponding change in the character of its fauna. Evidence of such change of temperature, independently of that which is so conclusively furnished by the fossils of the strata, is to be gathered from the alteration in the grant of food to mankind after each successive reduction; thus in his primeval state of happiness we find the fruits and berries allotted to him; while after the fall when the change was such as to render clothing necessary,—the grains, or “herb of the field” are given; and finally, after the flood, when the temperature was gradually still further reduced, the grant extended to “every moving thing that liveth,”—“even as the green herb have I given you all things.” A more convincing proof of that care and providence which the Almighty extends to all His creatures, could scarcely be desired.

But as there is also proof that all the land now existing did not rise from the waters at once, but was gradually or rather locally upheaved from

time to time, it becomes evident that as the continents increased in size, and their mountains in elevation, the change in the temperature of the postdiluvian climates, would have kept pace with the varying condition of the Earth, becoming gradually colder and colder as the land extended,—until the tertiary era had terminated, and the elevating forces had comparatively become quiescent. Thus the Eocene or older tertiary deposits which took place at the commencement of the re-appearance of dry land, naturally contain the remains of animals which were adapted to a warmer climate, than do the deposits of the after periods, while the mixture of extinct and recent genera and species in the strata of the whole series furnishes indubitable, and, as it were, thermometrical evidence of the gradual refrigeration of the climates of the Earth from the opening of the tertiary epoch or subsidence of the Deluge, down to its termination.

It was consequently during some part of this time that the land became tenanted by the mammals, whose remains are now so abundantly found, and these have again disappeared or become extinct as the mountainous regions of the north successively attained their final elevation, and reduced the temperature to that of the present day.

It has long been customary among those who regard with distrust the conclusions at which geologists

have arrived, (and we confess that we were once among the number) to point triumphantly to the accumulations of these bones of large terrestrial animals, as furnishing indubitable evidence of the actual occurrence of the Deluge; whereas a more intimate acquaintance with the nature of the evidence upon which the conclusions of geologists are founded, would have shown that while the Deluge is a fact which the narrative of Scripture places beyond the reach of doubt,—the fossils to which that cataclysm is erroneously conjectured to have given rise, are the remains of animals which only came into existence after that event had terminated, and which died out when the temperature, in which alone they were fitted to exist, was destroyed by the changes taking place in the countries of their abode;\* and this is still more conclusively established by the fact, that not only are such remains imbedded in strata belonging to a period subsequent to the subsidence of the Deluge, but likewise, that more than one carcase has been discovered in the frozen regions of Siberia still retaining the hair, and the flesh so little decayed, as afterwards to become the prey of carnivorous animals, such preservation being quite incompatible with the idea that the animals

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\* The dodo may be cited as an instance of such extinction of species when no longer required.

had been destroyed by the rise of the Deluge, and had been immersed in its waters for a period of many months. They could not therefore have lived in those ages which preceded the deposition of the chalk, and consequently not being in existence previous to the Mosaic Deluge, that event could not have destroyed them.

Nor is there matter for astonishment in this, since if the evidence to be drawn from the fossils of the earlier periods can be relied on, the lands inhabited by the human race, were situated near the tropics, and became submerged or subsided, according to the vision of Enoch, at the time when the general destruction took place. Man's antediluvian abode is therefore no longer in existence, and the non-discovery of his remains is thus clearly accounted for in the fact that they lie buried in one common grave beneath the waters which overwhelmed them, and in which they are probably destined to remain, until that day when "the sea shall give up the dead which were in it."\*

Nor does the occurrence of such animals as the mammoth, mastodon, and other forms whose analogues are now only found in the warmer parts of the Earth necessarily prove that they must have inhabited a country enjoying a very high tempera-

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\* Revelations xx. 13.

ture, for we see something of a similar kind in the present day, in a species belonging to what may be termed a tropical family, residing in a cold climate, while its congener is confined by constitution to warmer regions; for as the mammoth and rhinoceros of Siberia both differed from existing species in being clothed with hair, and a thick undercoating of wool to protect them from the cold of the more temperate regions in which they dwelt,—so precisely may the Bactrian camel (*C. Bactrianus*) be said to be distinguished from the dromedary (*C. dromedarius*) by its superior clothing;\* and while the latter species can only thrive in the hotter parts of Asia,—the former prefers the elevated steppes of Northern Tartary, where though the summers are reported to be warm,—the winters are extremely rigorous; yet such is the hardihood of his constitution, that the winter is the season when the trade between Turkistan and Russia is carried on; that season being selected because then the rivers which intervene between the various northern states, are frozen up by the severity of the frosts, and the camels are thus enabled to pass over on the ice.

Why then may not the extinct races have inhabited Northern Europe at a time when its climate and perhaps its vegetation may have re-

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\* *Vide* Frontispiece.

sembled those of the northern parts of Central Asia?—for a tropical and luxuriant vegetation may have been no more necessary to nourish the northern elephant of other days, than it is now for the nourishment of the northern camel of the present day. In India, we find the dromedary feeding chiefly on the leaves and tender branches of trees,—but in Affghanistan and the northern steppes, where trees are seldom seen except in orchards,—the camel and the dromedary both feed on the low wormwood and camel thorn. The mere presence of an elephant therefore, among the animals of the northern tertiaries, is by no means more indicative of a tropical vegetation, than would be the remains of the Bactrian camel or the dromedary.\*

Granting then the general accuracy of what has been advanced, it will be seen that as each successive upheavement took place from beneath the ocean, the *creation* of a fauna adapted to the existing condition of the land, must likewise have been necessary; while, if the elevation proceeded gradually, the first effect would have been the formation of a number of islands or mountain tops protruding through a sea of locally shallow depth, giving birth to the species peculiar to itself,—and

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\* It has been well observed that judging from analogy,—no one would have assigned a *lichen* to the reindeer!

which, as the elevating process continued to be exerted locally and fitfully, would have fallen the first victims to the changes then in progress, and would have furnished materials for those appearances which characterize the Eocene deposits. It is not difficult, therefore, to imagine how such shifting lands may have been successively occupied by marine and fresh-waters in a manner to give rise to all the phenomena of the tertiary basins, for supposing that the hollows and inequalities of the shallow seas along the coasts, were stocked with species suited to such localities, a subsequent further elevation of those tracts, accompanied by a simultaneous and probably violent uprising of the surrounding dry lands, may not only have reduced the temperature and destroyed the previously existing organic forms, but likewise have furnished larger rivers, which flowing into the marine shallows, now converted into lakes and estuaries, would have produced a fresh-water formation above a marine deposit; and this again may have continued until some further convulsion, caused either by a partial subsidence of the land in question, or by the violent uprising of some neighbouring tract, may have sent a passing debacle to overwhelm the whole beneath a newer deposit from the sea, intermingled with the species of the land; and to such changes the varying surface would no doubt have been liable until land had

permanently usurped the place of water and predominated. "The tertiary formations were therefore deposited when the physical geography of the northern hemisphere had been entirely changed. Large inland lakes had become numerous, as in Central France and other countries. There were gulfs of the sea, into which considerable rivers emptied themselves, and where strata, like those of the Paris basin, were accumulated."\* Thus the animals, whose remains we find imbedded in lacustrine tertiaries, or scattered among the superficial gravels of the land, may once have roamed over the gradually extending countries of the northern hemisphere at various periods of the tertiary era, and even long after its close, for many are found in formations more properly belonging to still more modern times. All have, however, gradually disappeared as the climates and the nature of their habitations underwent a change, until at length it would appear as if the final uprising of the mountains of the most northerly tracts, had reduced the temperature to a point unsuited to the constitutions of the remaining forms, and had overwhelmed them in the rush and turmoil of the agitated and receding waves.

Now, according to the theory of elevation and subsidence proposed in our earlier chapters, it will

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\* Lyell's Principles of Geology, p. 243.



be seen that one necessary consequence of the uprise and preponderance of mountain ranges in the north, will be the subsidence of land and prevalence of water in the southern hemisphere. As this condition actually exists, we are fairly at liberty to infer that each successive elevation of strata gave rise, through the disruption and sudden exfoliation of the heated and shattered rocks, to vast quantities of fragments and detritus, which would have been hurried off by the displaced and retiring waters, and strewed over the countries of the north in a decreasing ratio, as the debacle retreated towards the subsiding bed preparing for it in the southern regions. To such causes is, perhaps, to be attributed the occurrence of the vast accumulations of gravels, boulders and erratic blocks, termed "*drift*," so frequent in the northern tracts of Europe; and the various periods of deposition which they indicate must be due to the local and oft repeated disruptions and elevation of land in various quarters, as the present continents emerged.

In short, "in whatever way we consider the phenomena of gravel, and the presence of diluvial drift, frequently containing very large boulders, we can hardly avoid referring for its origin to the elevation of the loftier portions of the earth's surface; and one explanation that very naturally suggests itself to the mind is, that these subterra-

neous movements, originated vast waves, which washed over the surface of the land and carried along with them numerous masses of rock, loosened and broken away during the uplifting of the bed of the ocean and the adjacent land. Nor is such an hypothesis in any degree unreasonable. The tops of the most lofty mountains have, in most cases, risen from the bottom of the sea, and there is every reason to suppose that the series of elevations to which they have been exposed has been continued to a very recent period. Those forces, therefore, which, whether by sudden and violent efforts, or by a long series of less convulsive movements, have, at successive intervals, produced the great chain of the Alps and other subordinate mountain chains in Central Europe, must, in all probability, have produced at each one of such greater upheavals, a vast wave, affecting an extensive portion of the bed of the surrounding sea or ocean, and this wave, propagated over an extensive tract of what is now Northern Europe, may have carried along, with resistless violence, the innumerable fragments it would wash away from the flanks of the future and rising mountains. It is perfectly clear that if the series of elevations, which have brought the continent of Europe into its present position, and have effected its physical configuration, were the result of the often repeated action of impulsive forces acting from beneath

the Earth's surface, there must have been produced, through a large portion of the whole tertiary period, and even up to the most recent time, a succession of diluvial waves, some of which may have been so extensive as to include the whole continent within their sweep, while others were only local, affecting particular districts, and leaving no marks of disturbance elsewhere."\*

What cause for astonishment then, if during these ever recurring scenes of change and violence, no relics of the human race were commingled with the remains of those feral brutes which tenanted the present continents in those early times? The absence of human bones from the lacustrine tertiaries of Europe is not to be accounted for, as some would have us believe, by denying man's existence upon the Globe,—but by the simple fact that he had not yet migrated towards the agitated shores of Europe, from the eastern regions in which he dwelt; and so far from his creation being posterior to that of the animals whose remains are imbedded in the *tertiary strata*, he is actually found to have *preceded them* by more than *two thousand years!*

“Upon a review, then, of all the facts above enumerated, there appear grounds for inferring that the eras of the principal alterations in climate,

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\* Ansted's Geology, Vol. II., p. 118.

as deduced from fossil remains, were coincident with the periods of the most remarkable changes in the former position of sea and land. A wide expanse of ocean interspersed with islands, seems to have pervaded the northern hemisphere at the periods when *the transition and carboniferous rocks* were formed, and the temperature was the hottest and most uniform. Subsequent modifications in climate accompanied the deposition of *the secondary formations*, when repeated changes were effected in the physical geography of our northern latitudes. Lastly, the refrigeration became most decided and the climate most nearly assimilated to that now enjoyed, when the lands in Europe and Northern Asia had attained their full extension, and the mountain chains their actual heights."\*

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\* Lyell's Principles of Geology, p. 216.

## CHAPTER XXVIII.

NEW CREATIONS AFTER THE DELUGE, NOT CONTRARY TO SCRIPTURE; THE PRESENT POLAR REGIONS POSSESSED A TROPICAL CLIMATE DURING THE SECONDARY OR ANTEDILUVIAN ERA; NO AQUATIC ANIMALS WERE PRESERVED IN THE ARK; FRESH-WATER SPECIES OF THE PRESENT DAY ARE POST-DILUVIAN CREATIONS; NO PREDACEOUS ANIMALS PRESERVED IN THE ARK; THE PRESENT PREDACEOUS TRIBES ARE POSTDILUVIAN CREATIONS; NO ANIMALS NOW PECULIAR TO COLD CLIMATES EXISTED IN THE ANTEDILUVIAN ERA; PROOF FROM SCRIPTURE; THE ANIMALS PRESERVED WERE PROBABLY THE DOMESTIC RACES ONLY; DOMESTIC STOCK OF THE MODERN ERA NOT TO BE TRACED FROM THE WILD RACES; MANY WILD ANIMALS ARE RESTRICTED TO PARTICULAR COUNTRIES AND LOCALITIES; THEIR DIFFUSION FROM A FOCUS IMPOSSIBLE; THE OLIVE TREE A PROOF OF NEW CREATIONS.

It now becomes necessary that we should draw attention to a fact, which, to those who have hitherto been accustomed to view the whole of the organic races of the present time, as the descendants of species which were preserved from destruction in the Ark, may at first sight appear to be unorthodox and opposed to the plain reading of the Scriptures. A little reflection, however, will, we are persuaded, easily convince any candid mind, that not only have frequent creations of

organic beings been rendered necessary, since the days spoken of in Genesis,—but that the fact of such creations is both recorded in the strata of the Earth and corroborated by the true meaning of the Scriptures. The truth of this statement will be rendered fully apparent, if we admit, what in fact cannot now be denied, that there is abundant evidence to show that the climates of the Earth were far warmer in the by-gone ages of the world, than they are at present, and that this change or deterioration has been consequent on the varying condition of the Globe and the frequent alterations which have taken place in the relative distribution of land and sea, during the period in which, as Mr. Lyell remarks, the northern hemisphere was passing from the condition of an ocean, interspersed with islands, to that of a large continent.

It surely cannot be denied that the change from a tropical to a polar temperature, which is proved on the unerring testimony of fossil organic remains, to have taken place in the now frozen regions of the north, would have terminated the existence of the tropical fauna of those tracts within its influence? And consequently it must be admitted likewise, that unless these new climates had been destined to remain for ever barren and untenanted, some new organic forms, endowed with constitutions adapted to the changes that had taken place, were absolutely required to inhabit them.

An attentive consideration of such facts, and a rational interpretation of the Scriptures, will tend materially to establish the strict truth of these views, by showing that at least *one whole class* of animated beings was necessarily excluded from the Ark,—namely—*the fishes*—both of marine and of fresh-waters. No mention is made of any of that class having been preserved; from which we may infer, that like the vegetation, they were destined for destruction; and the silence of the historian respecting this fact, may have arisen simply from his deeming it unnecessary to record so palpable a truth, further than by stating that *the Earth*, and consequently *the fresh-waters of the Earth*, were overwhelmed by the ocean; by which it would necessarily follow that *the river fish* at least must perish. The species, therefore, which inhabit the fresh-waters of the present day *are all new creations subsequent to the subsidence of the Deluge*, and which, as the rivers of different countries are furnished with many species, absolutely peculiar to themselves, must have been created from time to time, as the several regions in which they occur, were successively elevated and converted into dry land; and the same remark must equally apply to the molluscous, and other truly aquatic animals.

It would, moreover, appear that if, according to the popular belief, some of *every species* had been

taken into the Ark, the recent and fossil races ought to be identical; whereas we find them to be in most cases *totally distinct*. "Of fishes, the carboniferous, oolitic, and chalk formations present, respectively, an entire change of genera. Agassiz, who enumerates 1,700 species of fossil fishes, and about 8,000 living species, states that, with the solitary exception of a species found in the nodules of claystone, on the coast of Greenland, and which is probably a modern concretion, he has found no animal in all the transition, secondary and tertiary strata, which is specifically identical with any fish now living."\*

But this line of argument may be carried still further, for we find from the records of Holy Writ, that none of the predaceous tribes, either of reptiles, birds, mammalia or other living things, were saved from the destruction which then visited the Earth.

We ground this opinion on the fact, that in pointing out to the Patriarch, the races to be preserved,—the Almighty expressly informs him, that of the animals to be saved, two of every kind of unclean beast, and seven pairs of clean beasts, *should come* unto him;—but that he was *to gather to him of all food that was eaten*, and that it should be for food for *him* and for *them*. Hence

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\* Dr. Harris' Preadamite Earth, p. 304.



it is plain that *none but the herbivorous animals* were preserved, for while it is said that the number of beasts *should come unto him*,—he is expressly desired to gather, by his own labour, *the food to be eaten by himself and them*; that food being, according to the original grant, “*every green herb.*” Consequently the declaration that the animals should come unto him, was a clear *promise of assistance* on the part of the Almighty without Whose aid it would have been absolutely impossible for Noah to have captured the various species which were destined to survive the approaching revolution; for, with the exception of the few animals held by man in a state of domestication, we must suppose them to have been scattered wild upon the Earth as they are now. Noah, therefore, in collecting the food to be eaten by him and by them, merely gathered in a supply of vegetable forage and grain necessary for the sustenance of the herbivorous and granivorous species,—and as the greatest of any number taken into the Ark is stated to have been *seven pairs*, it is evident that *no carnivora* could have been saved, for there was no food provided for them, the *seven pairs* being destined for sacrifice and to keep seed alive upon the earth,—and the same argument equally applies to all insectivorous and otherwise predaceous tribes.

The Scripture statement thus seems distinctly to point out, that none but such species as could subsist upon a farinaceous or herbaceous diet, were saved,—and consequently we must infer that all the existing races of wild predaceous birds, mammalia, reptiles and others, have been created since the Deluge, at once adapted for and produced in those countries and climates in which they are found, and to which the subsidences and subsequent disturbances and elevations of that last general cataclysm have given rise.

If, moreover, there is evidence to show, as we believe there is, that former conditions of the Earth enjoyed a far higher temperature than now, and that by a particular distribution of land and sea, that temperature was generally and equally diffused, it would seem to be satisfactorily established, that *no animals or plants of a cold or northern clime were then in being*. This argument, indeed, derives ample support from the fossil phenomena of the transition and secondary strata, the whole of which can only be referred to a climate analogous to that of the tropics of the present time. If then, the plants and animals of that golden era in the history of our planet, are found to be such as, reasoning from analogy, could only flourish beneath the smile of warm and sunny skies, we are naturally led to conclude that climates and their productions were mutually

adapted to each other; and consequently that the primeval condition of the temperature of the Earth's climates was wholly that of a tropical character. If such reasoning be admissible, and the organic remains of former periods are allowed to furnish data from which we may satisfactorily determine this point, then can we have no hesitation in declaring that previous to the Mosaic Deluge or deposition of the chalk, *no animals or plants, now peculiar* to the colder regions, were in existence, but that they have been created as the climates and the countries which they now inhabit were from time to time produced, as the land arose and caused the waters to subside. Nor are we altogether left without the testimony of Scripture evidence on this point; for while in the original grant of food to man and the brute creation, we have seen, that the allusion is wholly restricted *to the fruits and vegetation* of the Earth, so as entirely to exclude *predaceous* animals, and therefore to prove that they were created at some after period; we subsequently find this interpretation confirmed by that passage of Genesis which declares that after the subsidence of the Deluge, "God spake unto Noah, and to his sons with him, saying, and I, behold, I establish my covenant with you, and with your seed after you; and with every living creature that is with you; *from all that go out of the Ark to every beast*

*of the Earth!*" Is it not evident from this declaration that a marked distinction is made between the beasts that *went out of the Ark*,—and some other *beasts of the Earth*? And to what others can we refer, save to those which God had seen fitting to create, in order that the *new climates* which the late revolution had produced, and would still thereafter produce, might be stocked and replenished in common with all other quarters and portions of the Globe? The passage, in short, seems distinctly to intimate, that God had established his covenant not only with the human race, but likewise with all organized nature, *as well* the beasts which *went out of the Ark*, as those which *were already on the Earth*, or were eventually to be placed there.

Nor again does the text, as is usually imagined, necessarily imply that Noah took with him into the Ark, *two of every living species*, but only two of every kind that the Almighty foresaw would *be able to live and thrive*, when the waters should have again subsided from off the Earth,—for it would be an absurdity to suppose that animals which were fitted only for a residence in the hot tropical climates of the antediluvian era, would have been taken into the Ark only that they might afterwards be destroyed by the cold temperature of the succeeding periods. The actual number saved is, however, quite immaterial, and the text

is clearly intended to convey to us that the animals taken into the Ark, went in *by pairs*, that is, always a *female to every male*, but that the number of these pairs varied according as the animals were considered clean or unclean.

True, as we are informed in the 8th verse of the 7th chapter of Genesis, that there were saved "*two of every thing that creepeth upon the Earth,*" it would seem to embrace "every thing" that was living in the days when the history was written; yet as we know that the changes which the Earth has undergone, have invariably produced climates and stations which had not previously existed, so we must feel satisfied that after each convulsion some new species both of plants and animals were created to inhabit them; while we must likewise conclude that as new climates required the creation of some new species, so many of the former genera and species must have become extinct, when those convulsions destroyed the climates for which alone they had been adapted. That many genera and species were excluded from the Ark is shown in the fact that neither the insectivorous nor carnivorous tribes, nor the fishes and mollusca or other aquatic beings of the rivers, lakes or seas were preserved; so that the passage "every thing that creepeth upon the Earth" must not be supposed to embrace every thing that was actually living at the time when

the history was written, but simply "every thing" that the Almighty foresaw would be useful, and able to exist and thrive in the postdiluvian countries! One example of a fresh creation, will be sufficient to place the matter beyond all doubt. Now it is a well ascertained fact that the African negro is infested with a parasite, the *Pediculus nigritarum*, which is specifically distinct from that which infests the white man;\* hence as it is peculiar to the descendants of Ham, who are a postdiluvian race, so is it evident that their peculiar parasite is a postdiluvian creation. Or, again if we are to believe that man was created immortal, and that being free from sin, he was likewise free from pains, and sickness and decay, we must necessarily admit that all those numerous parasites, which now torment and prey upon him, were as yet not created. "More than twenty of these pestiferous creatures attack man and make him their constant abode. Some penetrate into the very seat of thought;<sup>1</sup> others disturb his bile;<sup>2</sup> others circulate with the blood in his veins;<sup>3</sup> others again are seated in his kidneys;<sup>4</sup> others in his muscles;<sup>5</sup> the Guinea worm in his cellular tissue;<sup>6</sup> the ovaries of females are infested by

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\* Kirby on Animals—Bridgewater Treatise—p. 85, Vol. I.

<sup>1</sup> *Echinococcus hominis*.

<sup>4</sup> *Strongylus gigas*.

<sup>2</sup> *Fasciola hepatica*.

<sup>5</sup> *Hydatigera cellulosa*.

<sup>3</sup> *Linguatula venarum*.

<sup>6</sup> *Filaria medinensis*.

another;<sup>7</sup> the tape-worms, of which there are five species, extend themselves joint by joint to an enormous length in his intestines;<sup>8</sup> some select the large intestine;<sup>9</sup> and others the small one;<sup>10</sup> some even attack infants, and them only.”<sup>11</sup> \*

Here then are a host of parasites whose creation cannot date before the fall,—a fact which, in the case of that particular species which is peculiar to *infants*, is placed beyond all doubt, and consequently the belief that no creations have taken place posterior to the first week of Genesis must yield to facts and be discarded.

It would therefore appear probable that the animals preserved by Noah, were such only as it was foreseen would be useful and capable of living in the after ages of the world, and these may have consisted chiefly of those domestic species, which are still retained by man in every civilized country, and many of which appear to have no specific relationship with any of the wild races now living, such as our oxen, asses, camels, sheep, goats, &c.

If such were the case it is evidently labour lost to search among the wild races of the present day for the original stock of our domestic breeds,

<sup>7</sup> *Linguatula pinguicula.*

<sup>9</sup> *Trichocephalus hominis.*

<sup>8</sup> *Tœnia solium et botryocephalus hominis.*

<sup>10</sup> *Ascaris lumbricoides.*

<sup>11</sup> *Oxyurus vermicularis.*

\* Kirby on Animals, p. 324, Vol. I.

for it can scarcely be supposed, with any show of reason, that man who had once held every species in captivity under his immediate control, would have suffered them to escape and roam over various quarters of the Earth, until they had become wild and difficult to approach, and that then he should have turned his attention to the means of recapturing and reducing them again to subjection;—besides, as the Scripture declares, that only seven pairs of each of these animals were preserved, and as we read that some of each kind were sacrificed by Noah on his descent from the Ark, it becomes more than improbable that any of them regained their freedom; and consequently that many of our domestic breeds have descended from stock which lived before the Flood; so that neither can they be traced from the wild races of the present time, nor can the latter be traced from them, but are distinct, and furnish another example of fresh creations after the Deluge.

This opinion seems to be, in a great measure, borne out by the fact that our domestic breeds of sheep, which some naturalists would wish us to believe to have been derived from a cross between two or more of the wild races, possess characters which appear at once to refute the idea of such a descent. All domestic sheep possess a *lachrymal sinus*, or tear pit, beneath the eye,—a character apparently possessed by few of the wild



ones;—all the wild sheep have *short tails*, whereas most of the domestic varieties have *long tails*;—and again, the domestic sheep, even where most neglected, possess a woolly covering which is quite unknown among the wild breeds. It is argued that this peculiarity is an effect of cultivation, and that where sheep are neglected, the wool degenerates into a coarse hair;—this may be true; but still, whether cultivated or neglected, the character of that wool or hair is quite distinct from that of the wild breeds, which possess a coat of stiff, deer-like hair with a soft under-fleece of extremely fine wool which is in no respect like that of any domestic sheep, but is similar in its nature and property to that of the *shawl goats*. This being the case, if cultivation or domestication has converted this soft "*pushm*,"—wool into the *coarser* fleeces of our sheep,—why has not the same effect been produced upon the *pushm* or wool of the shawl goat? For in the hilly regions where these goats abound, their wool is still like that of the wild sheep,—while the wool of the flocks of the same region, possesses the character common to all the domestic varieties—and again, the very fact that neglected sheep wool degenerates into a *coarse hair*, seems to furnish a most decided proof that such wool was not originally derived from *pushm*; for had such been the case, degeneracy should tend to reconvert it into *pushm*,

instead of into hair even coarser than the wool ! In the mountainous districts where the shawl goat abounds, there are likewise flocks of sheep possessing a fine soft wool apparently peculiar to those elevated regions. There the chief care is bestowed upon the goats, and yet its wool remains unchanged, as does likewise that of the less cultivated sheep; yet while the *pushm* of the one shows no tendency to be converted into wool,—the wool of the other shows no inclination to degenerate into *pushm*.

Even if it be argued that our *short-tailed* domestic breeds have been derived from wild stock,—the same argument cannot be maintained in respect to those with *long tails*, and therefore another proof is furnished that they are *sui generis*. We are well aware that this has been denied,\* but as such denial amounts to a mere assertion, unbacked by either proof or argument, it cannot be admitted as furnishing the least objection to the facts above produced. But since we read that sheep were placed under the dominion of man from the earliest period of his existence,—and since, like the dog, these animals are endowed with constitutions which fit them for an existence in almost every climate to which the human race extends, it would appear to be by no means unrea-

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\* Journal Asiatic Society, Bengal, 1846, p. 154.

sonable to suppose, that such creatures being created for the comfort and wellbeing of our race,—were placed *ab initio* under man's control, and therefore that they are the descendants of the antediluvian stock. An opinion seems generally to prevail, that all animals were originally created wild, and have been gradually reclaimed by man; but wherein lies the necessity for such belief? or why may there not have been original domestic races, as well as wild ones? It would seem, indeed, more reasonable to suppose that those species which were especially destined to minister to his comfort and necessities, were at once placed under man's dominion,—than that he should have been subject to the toil and uncertainty of capturing them; and if we further allow that two closely allied species of sheep, were, among others, entrusted to his care, the one with long tail, adapted for the plains,—the other with a short tail, like the wild mountain breeds, adapted for the hills, which would indeed be no more than a just admission of the creative foresight,—then the after intermixture of these two breeds or races, may have furnished all the varieties with which we are acquainted. Of the very high antiquity of at least one of our domestic breeds, abundant proof exists in the Scriptures. The species to which we allude is the "broad-tailed sheep," which is abundant throughout the countries of Central Asia.

The singular enlargement of the tail in this animal, is ascribed by Pallas to the prevalence of wormwood in the pastures,—but if such were the case, this feature should become larger or smaller, or disappear, according as such pasture abounded or decreased;—why then have not the sheep of Upper Kunawur and Hungrung in the Himalaya, the broad tail,—for wormwood abounds there, and forms one of the chief plants in the pasture of those elevated tracts? The “broad-tailed sheep,” which is but a variety of the “fat-rumped” species, or “*Ovis steatopyga*”—occurs throughout Afghanistan, Bokhara, Persia and Palestine; it occurs also with some modification in Africa and elsewhere. The earliest mention made of man’s possessing flocks, is in the 4th chapter of the book of Genesis, where, at the 4th verse, we are informed, that Abel “brought of the firstlings of his flock,” as an offering to the Lord.

Since then, at this early period, a sufficient number of animals were domesticated to enable man to offer up the daily sacrifices which it appears was then the custom, and since, moreover, we know that the animals were created especially for man’s use and comfort, it is evident that some of the more useful races must have been placed from the beginning under his control as domestic stock; for it is clearly impossible that he could, by any exertions of his own, have captured and

subdued a sufficient number of the wild mountain breeds, at the period alluded to, to enable him to offer up such sacrifices. In this case, such cattle would have descended from generation to generation, even to the period when God commanded Noah to build the Ark, and they consequently formed part of the stock preserved alive with him, and became the foundation of his domestic flocks after the Flood, and were diffused again with his descendants from the country where the Ark rested. They were therefore part of the stock which Abraham and Lot possessed, and which, after them, Jacob tended while serving Laban for his daughter Rachel. This opinion is well supported by the fact, that the general colour of the breed is in some districts the same now, as in that early period, for we read that Jacob's hire was to consist of all the ring-straked, speckled, and spotted among the goats, and of all *the brown among the sheep*; hence it is easy, without the aid of a miracle, to see how his flocks increased, while those of Laban diminished; since to this day, there are few domestic goats without some speck or spot, and since the prevailing colour of the broad-tailed sheep is a brown of various shades. It was indeed an arrangement well calculated then, as it would be still, to enrich the one party and impoverish the other, and if we only allow that Jacob was an observing shepherd, and

had learned that "*like breeds like,*" the secret of his great success is at once made manifest.

With Jacob, therefore, and his sons, they were taken up into Egypt in the time of the famine under Pharaoh's reign, when the land of Goshen was allotted for a residence to the Israelites: and of course, from thence they accompanied that people throughout their wanderings into the promised land, after the Exodus from Egypt. Now, that the sheep known to the Jews was the *Ovis steatopyga*, would seem to be amply proved from the 29th chapter of Exodus, where, at the 22nd verse, in describing the manner of a certain sacrifice to be offered up,—it is written, "thou shalt take of the ram *the fat and the rump*, and the fat *that covereth the inwards*, and the *caul above the liver*, and *the two kidneys*, and *the fat that is upon them*, and the right shoulder; for it is a ram of consecration." Here there is evidently a marked difference made between the fat of the tail and the fat of the inwards and kidneys, for the words "the fat and the rump" clearly show that they were distinct parts of the animal, otherwise it would have been written, "*the fat of the rump.*" It is likewise held distinct from the fat of the other parts, as "the fat of the inwards," and "the fat of the kidneys;"—now it is a notorious fact, that the fat here mentioned is literally all that the animal possesses, unless kept up

and fed with grain, which Asiatics never do; so that the passage reads “the fat *tail* and the rump,” &c. We have consequently a true description of the *Ovis steatopyga*, in which there is “a solid mass of fat on the rump, which falls over in the place of a tail, divided into two hemispheres, which take the form of hips with a little button of a tail in the middle.”\*

Again, all doubt upon the subject appears to be removed by a passage in the 3rd chapter of Leviticus, where, at the 7th and following verses, in explaining the method to be adopted in “offering up a sacrifice for a peace offering,” it is written—“if he offer a lamb for his offering, then shall he offer it before the Lord. And he shall offer of the sacrifice of the peace offering an offering made by fire unto the Lord; the fat thereof, *and* the whole rump, it shall he take off hard by the backbone; and the fat that covereth the inwards, &c.” Here then it will be observed, that not only is the distinction between the fat of the hinder parts, and of the inwards again repeated, but we are instructed more particularly that the tail was the part alluded to, since “the fat thereof *and* the whole rump,” were to be taken “*off hard by the backbone,*” thus clearly pointing out the part where the fat was situated, namely, in the rump

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\* Naturalist's Library.

and tail, which takes its origin from, or is a continuation of the end of the backbone. It must further be remarked, that the word "*and*" written in italics in our translation, does not occur in the original, but has been added to show the supposed connection of the words "*the fat thereof*," with those of "*the whole rump*." Therefore, in the original, the passage would stand thus—" *the fat thereof, the whole rump, it shall he take off hard by the backbone;*" and that the fat tail of the sheep is the part alluded to is proved by the word "it;" otherwise, if "*the fat thereof*" and "*the whole rump*" had been separate parts, they would not have been specified in the singular number, by "*it shall he take off*,"—but by "*them shall he take off*." We thus perceive, that allusion is made to the peculiar formation of the hinder parts of the "*Ovis steatopyga*," in which the fat of the rump actually descends in two lobes, one on each side of the tail, which it so completely envelopes as to leave only the tip of it apparent, and thus while it contributes to form the broad tail which characterizes the species, it still remains likewise a part of the rump, commencing at the end of, or "*hard by the backbone*" as correctly stated in the above passage of Leviticus. Thus we perceive, that so far from this species having sprung from any living wild breed, it is, in all probability, one of the most ancient of all our



sheep and the stock from which many of the domestic varieties, which now contribute to the comfort of mankind, have themselves descended.

It must be observed, however, that this argument will not apply universally to our present stock, since we know that our peafowl are still living wild in the forests of Eastern Asia; that our Guinea fowls are still wild in Africa; our ducks in the northern climates of almost every country; and our rabbits are still wild in Europe. All this is true, but yet it does not at all affect the truth of the previous argument, for these species which minister rather to the luxuries than to the necessities of human life, are all comparatively of modern introduction to our farms, and therefore if they too, according to the common notion, have descended from the Ark, they must have been allowed to regain their freedom as not then forming part of the stock which was esteemed for domestic purposes. But strange to say, with the exception of the mallard, these species are all confined by nature each to its own particular country! The fowls and peacocks are peculiar to the East; the Guinea fowls to Africa; the turkey to America; and the rabbit to Europe; and all are *restricted* to regions far removed and distinct from that which is supposed to have been the postdiluvian focus of diffusion! How then have they reached their present abodes,

and why are they there restricted? Or why have they not left a single individual of their species at stages intermediate between Armenia and their present habitat? So far indeed from that country appearing to be the ancient focus from which they were diffused, it is actually, as regards some, the point towards which mankind is bringing them. The peacock and the jungle fowl\* which appear by nature to be restricted to the forests of the east, have been domesticated and carried to the countries of the west; while the turkey and the rabbit, which are peculiar to America and Europe, have been transported to the east, where the Guinea fowl of Africa is likewise now domesticated. If then, these species, which in a wild state, are confined to particular climates and countries, are found capable of living and thriving under the protection of man, in regions far distant from their proper habitat, it would seem to argue that such restriction to particular stations, resulted not so much from the climates of their proper countries being alone adapted to their constitutions, as from the existence of *some natural barriers or impediments to their diffusion*, such as might result from seas and mountain ranges; and if

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\* There is, however, as yet no proof that the jungle fowls are the parent stock of our domestic poultry; the evidence rather tends to show that they are distinct, in which case the domestic race must be antediluvian.

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such obstacles exist, then would it have been equally impossible formerly for each species to reach its present habitat from the focus of diffusion, as it now is for them to extend beyond it without the assistance of man. They must therefore have been placed originally in their respective localities at the period of their creation, and consequently have not proceeded from the postdiluvian focus.

To follow out this inquiry would necessarily lead us far beyond the limits within which we must at present confine ourselves, but enough has perhaps been said to show, that if, in accordance with the commonly received opinion, we were to admit that all the animals now living, had been preserved from the Deluge in the Ark, and endeavour to show how they have become spread abroad upon the Earth, insuperable difficulties would meet us at every step, for numerous species and even genera are now confined to northern and polar regions where they are alone enabled to exist, and all of which must infallibly have perished in the hot and uncongenial countries of the south from whence their diffusion is supposed to have taken place.\* Need we do more than instance the polar bear, the reindeer, beaver, or walrus, not one of which, among a host

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\* If Ararat, in Armenia, were really the resting place of the Ark, a serious difficulty would arise in regard to the Bactrian camel! The Persians and Afghans both believe that the Ark rested in their countries, and there is reason to believe that Armenia was *not* the spot.

of genera and species, would ever have diffused themselves at all ; for the diffusion of animals is not rapid, but gradual, like that of man, who emigrates only when he finds himself unable to supply his wants in the country where he dwells. If diffusion then is gradual in the present day when the individuals of each species are generally so numerous, how much more so must it have been in former times when there was but one pair of each in the focus of diffusion? And if such difficulties arise from the purely local distribution of species living on the continents of our Earth, what explanation shall be given regarding those other genera and species which are absolutely restricted to countries and to climates not only far distant and distinct from the *locus* whence they are supposed to have issued, but which are moreover divided from it by a wide and almost interminable tract of ocean? How did the kangaroo and ornithorhynchus, restricted as they are to New Holland, succeed in reaching their peculiar abode, across the waters which separate it from the country of Armenia? With man they certainly did not spread, for while the history of nations teaches us that the domestic cattle and granivorous birds are diffused through his agency, it likewise shows us that the wild races fly before him and eventually as he tills and cultivates the Earth, they either become locally exterminated as in the instance of the bear, the wolf and the

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wild hog in Britain, and the dodo in the Isle of France, or they retire to the recesses of the forest, as on the continents of Europe and Asia. But again, although it may be said that man is instrumental to the spread of those species which are useful to him, and these carry with them the parasites peculiar to each; and although many species of granivorous birds and even of the rodentia, may follow him for the sake of the grain which he cultivates, yet it never could be contended that he would carry with him the carnivora, knowing that if he did so, his flocks and herds would be diminished, and his own cares and labour be materially increased. How then, supposing man to have stocked the various countries of the Earth with domestic races, did the carnivora *peculiar* to those countries gain access to them from the region of the postdiluvian focus? The answer is clearly this; they are *restricted* to certain regions, because it is there alone that their particular services are required, and because they are unadapted both by constitution and habits to thrive in any other locality; and therefore that they were created for and in the countries where they now dwell, when those countries and their present climates were first called into existence.

We have, if such be wanted, a still further proof of fresh creations in the mention of an *olive tree* springing up immediately on the retirement of the waters; for as terrestrial plants could not survive

beneath the waves during a period of ten months, especially since the soils or surface of the land was swept off and “obliterated,”—so it is evident that the olive tree which some geologists have cited as a proof of the quiet rise and subsidence of the Deluge, must either have been an entirely new creation, or what will answer fully as well,—a recently created individual of a species formerly existing.

And again, the vast mountain chains which now adorn the Earth, were successively upheaved in order to cause the waters to subside, and as they tower to a height which was unknown in the warmer antediluvian era,—so climates and stations must have been produced for which few of the already created beings were adapted. Fresh creations were therefore indispensably necessary, unless those regions were intended to be left barren and untenanted;—but since we perceive that the elevated tracts in every region produce some species *absolutely* peculiar to themselves, we are led of necessity to acknowledge that not only must fresh creations have been invariably attendant on the production of new climates, but that many of the *former genera and species*, must have become *extinct*, when such changes, by reducing the temperature, *destroyed the climates in which alone they were able to exist*; and thus we are once more brought to substantiate another doctrine of geology, namely, “that the creatures were constructed with a

view to the varying conditions of the surface of the Earth ; that repeated changes in species both of animals and vegetables in succeeding members of different formations give further evidence of important changes in the physical condition and climate of the ancient Earth ;”\* and that one race of beings has become *extinct* at a period when another *sprung into existence* to supply its place.

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\* Buckland's Bridgewater Treatise.

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## CHAPTER XXIX.

THEORY OF INDEFINITE TIME OPPOSED TO SCRIPTURE; ARISES FROM AN ERRONEOUS INTERPRETATION; EVIDENCE OF RAPID ACCUMULATION OF STRATA; PROVED IN THE TRANSITION SERIES; OLD RED SANDSTONE; MOUNTAIN LIMESTONE; COAL MEASURES; NEW RED SANDSTONE; LIAS; OOLITE; CHALK AND TERTIARY DEPOSITS; VOLCANIC AGENCY, MORE INTENSE FORMERLY; INDEFINITE DURATION OF THE EARTH REFUTED.

FROM what we have previously advanced it will be seen that the immense "drafts upon time," which geologists are wont to make, are in reality to be regarded as the chief obstacles to a satisfactory reconciliation of geological facts, with the plain and simple statements of the Scriptures. There appears, however, such strong evidence throughout the fossiliferous formations, in favour of the opinion that many of their strata have been rapidly produced, that we may perhaps be pardoned for once more touching upon the subject and endeavouring to bring these proofs together.

In the first place, it must be observed that the demand for unlimited time arises from an erroneous view of the true import of the second verse of Genesis,—which, by being divided from the preceding portion of *the same paragraph*, appears



to refer to some catastrophe, which had overwhelmed the Earth, spoken of in the first verse. Having already clearly proved that such division is unauthorized, unnecessary and erroneous, inasmuch as the statement contained in the second verse has sole and exclusive reference to the primeval condition of the Earth at that one particular period when its materials were called into existence by Omnipotence;—and having further shown that no darkness, such as that which geologists require, could, under the circumstances, have been produced,—we might perhaps, by thus destroying its foundation, allow the theory to fall to the ground; yet as there are, doubtless, many who will call in question the truth of our interpretation of those two verses, we deem it necessary to support our views by the further testimony to be derived from the condition of the strata and their imbedded fossils.

Commencing with the transition or lowest fossiliferous formation, we find that evidence of speedy deposition in the silurian rocks, is furnished by numerous indications of the frequent occurrence of volcanic forces acting with an intensity quite inconceivable and admitting of no comparison with the operations of the present day.\* The old red sandstone with its conglomerates imbed-

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\* Silurian System, *passim*.

ding not only pebbles, but boulders of enormous size, at once furnishes convincing evidence of the violence which gave origin to its strata, while ample proof exists to show that its deposition was rapid, for "it has been observed that the greywacke passes into the old red sandstone above it, in one part of Britain, while conglomerates considered to represent the latter rest on the disrupted edges of the former in another part of the same country, showing, in a comparatively small area, that while tranquillity prevailed and continued in one part of it, disrupting forces were in action in another, preventing the continuous and quiet deposition of detrital and other matter. The tilted character of the greywacke and the conglomerates here and there interposed between it and the carboniferous limestone, which are often, as professor Sedgwick observes, of great thickness, show the application of force and the destructive action of water."\* Now, as Bakewell has shown that the greywacke and old red sandstone, by passing into each other, are in reality parts of the same formation, the latter being nothing more than a greywacke coloured red, by an admixture of oxide of iron,—it becomes evident from the facts above quoted, that the hardening or consolidation of the greywacke took place rapidly during

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\* De la Beche's Theoretical Geology, p. 314.

the progress of accumulation, or it could not have supported on its upturned edges the conglomerate or superior portion of this formation. The facts advanced by De la Beche appear in short to prove that during the accumulation of the greywacke and sandstone, a volcanic disturbance occurred in one part of the area, consolidating and disrupting the already deposited portion through which it passed,—by the heat and pressure thus suddenly engendered, and probably giving rise to the red colour of the sandstone, or superior portion thereafter accumulated, by supplying or diffusing through the waters, an admixture of oxide of iron. Again, the mountain limestone gives proof of the speedy destruction and imbedding of its organic contents in the fact that they “*are not at all worn, but retain all their sharp processes and spines in perfection;*” the limestone itself being considered “*an original deposit from the waters of the ocean, not by desiccation,—but by a chemical decomposition of the fluid.*”\* Bakewell and the Revd. Pye Smith likewise both proclaim its chemical origin, and that it is often made up almost entirely of shells and coralloids though a thousand feet or more in thickness.† Now the very fact of the rock being composed of such a mass of

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\* Phillips' Mountain Limestone.

† Bakewell's Introduction to Geology. Revd. J. P. Smith on Geology and Scripture.

marine productions mingled together, not in layers or strata at the partings of the beds, as if they had died and become gradually buried beneath the deposit of lime,—but diffused irregularly through the mass, tends forcibly, in conjunction with the facts above quoted from Phillips, to show that the calcareous matrix in which the remains are buried, was not formed by the slow progress of precipitation through a long lapse of time, but was speedily produced from submarine volcanic vents, in the form of thick paste or mud,—which, by rapidly hardening, encased and so preserved the delicate spines and processes of shells and other bodies; while again the occasional alternation of this rock with beds of coal,—and the undoubted signs to be gathered from the state of the delicate leaves of ferns and other plants,—of their speedy burial in the sandstones and shales of the coal formation, likewise tends to prove that the formation of the two was contemporaneous and rapid,—the latter fact being also confirmed by the evidence of speedy deposition furnished by those sandstones containing the upright and inclined stems of *sigillariæ* and *equisetæ*.\*

Abundant proof is likewise furnished by geologists, in the perfect state of fishes, saurians and shells,—of the speedy and often instantaneous

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\* Lyell's Principles of Geology—"Fossil Flora."

deposition of strata belonging to the new red sandstone, and of some of the liassic, oolitic, cretaceous and even tertiary beds. And again the demand of time for the production of the large masses of corals, is sufficiently met by the fact that each new condition of climate and change in the depth of the ocean, required the creation of new organic beings, the whole of which being original or first creations of those particular species, must have been produced in full maturity of structure;—while the limestones in which they are now imbedded bear testimony to a chemical origin in their Oolitic structure. Nor can the fact of some dead species, bearing upon their remains the parasite *serpulæ*, at all counterbalance these testimonies to a speedy deposition, because setting aside the probability that such parasites were themselves original creations,—their attachment to other species might easily have occurred during the 2,000 years and more, which elapsed while the transition and secondary rocks were being formed.

“The marks of violence and severe pressure in many of the organic remains, prove that the strata containing them have not been deposited in a slow and gradual way; while the same thing appears from the high state of preservation in which fossil fishes are frequently found. It may seem inconsistent to draw the same inference from phenomena so opposite; and yet, in both cases, the

inference is just. With regard to the last, it is well known, that scarcely any substance decomposes more speedily than dead fishes; so that, when we find fossil fishes in a high state of preservation, we may be sure that the strata containing them were deposited so rapidly, as not to allow them time to become putrid, till they were safely incased in their present matrix. Now, the fossil fishes in the carboniferous strata,—in the magnesian limestone,—in the lias,—in the oolite,—in the chalk, and in some of the tertiary deposits are often found in the finest condition, with no part of their structure injured; while we know that fishes left dead on the beach or on the banks of rivers begin to decay in a few hours. The inference to be drawn from these facts, is well expressed in the words of Professor Phillips,—Treatise, p. 87: “Struck with the contrast offered by these layers of fishes in ancient marine sediments, with the few and scattered fragments which occur in modern deposits, M. Agassiz has conjectured, that the rate of deposition of these ancient strata *must have been almost inconceivably rapid.*”\*

That the lias was speedily deposited, the state of preservation in which its fossil remains are found, sufficiently attests;† “the saurians of this

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\* Revd. G. Young’s Scriptural Geology, p. 27.

† Buckland’s Bridgewater Treatise.

formation, both in England and Germany, very frequently present little appearance of having lain long exposed to the effects of decomposition before they were entombed: on the contrary, many skeletons of ichthyosauri show, by the contents of their stomachs still remaining between their ribs, *while there are even traces of skin upon their bones that their death must have been speedily followed by their envelopment* in the detrital matter of the lias, if, indeed, *they were not often entombed alive.*"\*

That the Oolite required no great lapse of ages for its accumulation, we have likewise seen in the perfect condition of its fishes, shells and corals,—which condition could not have been preserved unless the limestones in which the remains occur had been rapidly formed. “All those who have collected organic remains from the rocks themselves must have observed how frequently they are compressed in marls, clays and argillaceous slates, compared with the fossil contents of limestones and sandstones. When we recollect that every rock of the density of 2·6 and 500 feet thick presses with a weight equal to about 577 lbs. upon the square inch, we may readily conceive that the particles of mud beneath such a weight would be squeezed together; and yet it may be considered small when compared with that to which many

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\* De la Beche's Theoretical Geology, p. 334.

marls and clays must have been subjected. Shells and other organic remains contained in the mud must give way, and become compressed or fractured, as the case may be, and as we now find them in such situations. *In limestones*, on the contrary, *organic remains generally retain their original forms*, and there is little evidence of compression, except in seams of marl which may be interstratified with them. The calcareous matter appears for the most part to have been deposited among the organic exuviæ from aqueous solutions of carbonate of lime, in the manner we observe on the small scale in different situations. *Solidity probably accompanied the envelopment of the organic remains and hence they could not be compressed.*"\* This then affords a very satisfactory and conclusive proof that the deposition of the lime and its conversion into a solid rock, were very rapidly effected, for had the accumulation of this substance been as slow, as those who contend for indefinite periods would have us believe, the spines and processes of shells and other bodies must have been destroyed before their total envelopment could have been completed.

Equally satisfactory and indicative of rapid inhumation, is the state in which the fossils of the chalk are found; and as it may be objected that

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\* De la Beche's Theoretical Geology, p. 282.



the thickness of this system militates against the idea of its having been deposited in so short a period as that to which we have assigned it, we must once more inquire into the condition of its imbedded organic remains. We have already seen that the perfect state in which the fishes of the cupriferous slates are found is held by Dr. Buckland to be conclusive evidence of a speedy death and burial in the sediments of that early period,—so speedy indeed as to have preceded incipient putrefaction; and as like causes produce like effects, it is but fair to admit that the very perfect state in which the fishes and shells of the chalk occur, is likewise indicative of a speedy burial; for the state of these organic bodies is such as to prove that neither putrefaction nor friction had assailed them when they became imbedded. “In no formation,” says Bakewell, “are the most delicate organic textures of animals better preserved. In Dr. Mantell’s splendid collection of chalk fossils, there are specimens of fish, in which *the body is entire and the stomach is full and uncompressed*; and the beautiful forms of many *shells covered with spines*, prove that they could not have been drifted from a distance, or deposited in an agitated ocean.”\* And again he observes that “from the uncompressed state of the bodies of fish found in

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\* Bakewell’s Introduction to Geology, p. 350, *et seq.*

chalk containing animal remains, we may learn *that chalk was deposited in a soft state like paste or mud*; the fossil fish with their bodies entire and uncompressed, prove that the chalk which surrounded them was extremely soft and yielding, and this must also have been the case with all argillaceous strata, that contain remains of fish, not flattened by pressure. We further learn, that the animals were incased in mineral matter, before the putrefactive process had effected the decomposition of the fleshy parts. *A sudden eruption of thermal water, holding calcareous earth in solution or suspension*, might instantly deprive the animal of life and protect the body from decay." Here then we have one of our best observers propounding a theory almost identical with that which we have proposed, and yet he is no advocate for speedy operations, since he assigns, in common with geologists in general, many thousands of ages for the completion of our strata. It may be said that the volcanic origin we have assigned to the chalk is adverse to the supposition of a tranquil ocean; and that the agitation of the waters would have been destructive to the spines and processes of shells which now retain them; and such no doubt would be true, were we to admit of any length of time between the production of the chalk and the actual imbedding or encasing in it of the organic remains;—but the uncompressed

and entire state of the fish,—and the existence of the delicate spines of the shells, proves that no time elapsed, but that the production of the chalky matrix and the burial of the fossils, was almost instantaneous. That this mineral is not due to the mechanical causes which produce sandstones and clays, is proved by the absence of detritus, and thus its origin seems referrible only to the decomposition of the waters of the ocean, or more likely still to an injection or irruption of cretaceous mud, “while the preservation of the most delicate textures of animals proves, beyond a doubt, that those organic bodies had not been transported from a distance or subject to the violent action of inundations or currents.”\*

“*A rapid infiltration of silica* would also seem necessary,”—says De la Beche,—“for the preservation of those alcyonic bodies found in the flint and chert of the cretaceous series. The structure of these bodies is ill-fitted to resist pressure, and the state of their preservation is commonly such as to justify us in supposing *that they have never been exposed to it*, at least until mineralized in the rocks where they are now found; for their original texture is often as beautifully preserved in silica as if this substance *were suddenly introduced into, and filled up a sponge under no*

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\* Bakewell's Introduction to Geology, p. 353.

*greater pressure than that of the sea or atmosphere.”\**

We next come to the tertiary or supercretaceous group, and here again we find evidence of speedy death and burial, apparently effected through the agency of causes similar to those which produced the rapid inhumation of organic forms in the strata of the earlier deposits. Of the intense and active operation of volcanic forces, during the period in which the lands of the northern hemisphere were emerging from the waters, there is ample evidence to be gathered from the numerous extinct volcanos of different countries,—but especially in Europe, where “there is a district, in the southern part of the centre of France, more than forty miles in length and twenty in breadth, comprised in the ancient provincial division of Auvergne and Languedoc, [in which] are the unquestionable cones, craters and other characteristic remains of more than two hundred volcanic hills and mountains. These, in former periods of our planet’s history, have projected their tremendous fiery masses, ashes and water, into the air; and vast streams of the melted rocks along the ground.”† These extinct volcanos are said to have covered with their products, several

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\* De la Beche’s Theoretical Geology, p. 282.

† Revd. J. P. Smith on Geology and Scripture, p. 144.

thousand square miles, and the more recent of them has been extinct or dormant since the records of authentic history, and probably for a longer period.\* “According to Breislak, an Italian geologist, in a space of twenty miles in length, and ten in breadth, between Naples and Cumea, there are no less than sixty craters; some of them are larger than that of Vesuvius. In other parts of Italy, there are undoubted vestiges of ancient volcanos. In Sicily, there are a number of extinct volcanos, besides those connected with Etna. Many islands, in the Grecian archipelago are volcanic. There are remains of large volcanic craters in Spain and Portugal; and the extinct volcanic mountains in the middle and southern parts of France, cover several thousand square miles. On the eastern banks of the Rhine, and the environs of Andernach,—there are numerous extinct volcanos. It is further to be noticed, that the craters of ancient volcanos, are many of them of far greater size than the present ones. Vesuvius is a comparatively small one, raised within the crater of a larger volcano. The cone of the Peak of Teneriffe, according to the description of travellers, stands within a volcanic plain, containing twelve square leagues of surface, surrounded by perpendicular precipices and mountains,

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\* Bakewell's Introduction to Geology, p. 452.

which were the border of the ancient crater. If the opinion of Mr. Humboldt be correct, all these craters are diminutive apertures, compared with the immense chasms, through which, in remote ages, subterranean fire had forced a passage through the crust of the Globe.\* Now although the great thickness of the transition and secondary series has given rise to the opinion that thousands and tens of thousands of years have been necessary for their accumulation, yet from the above facts it would appear that we may still view the matter in another light, for if we augment the power of the agents by which such results have been effected, it is evident that we may materially curtail the time necessary for their production;—that is to say, that the forces which could produce these results during a million of years, would be able, if doubled in intensity, to complete them in half the time. Now, by calling in the aid, which from the appearances of the strata we are entitled to do,—of powerful volcanic agency often repeated, we at once secure the co-operation of a power ten thousand times more expeditious in its operations, and less limited in its mode of producing detritus, than all the rivers of the world united; while, at the same time, its effects are both chemical and mechanical,—so that deposits

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\* Bakewell's Introduction to Geology, p. 450.

which, by the ordinary course of atmospheric agents, would require a thousand years for their production, might, by the additional aid of volcanic forces, be completed perhaps in a few months. It has been erroneously argued that because “a particular Scottish lake does not form its deposit at the bottom, and hence raise its level, at the rate of more than half a foot in a century;”—*therefore*, the old red sandstone, surrounding that lake, would have required “*six hundred thousand years*” for the production of its three thousand feet of strata.\* But this is carrying inductive reasoning to the extreme length of absurdity, and *assuming* the past and present rates of deposition to be equal; or, rather, it is drawing a conclusion *from a part*, instead of from *all the facts* of the case,—for if there be evidence to prove, as no doubt there is, that the agents which were productive of the earlier strata, have operated in past periods with an intensity inconceivably greater than do any with which we are acquainted in modern times,—so are we compelled to admit that the accumulation of strata must have been proportionably more rapid,—for the one fact would be a natural and necessary consequence of the other. It is not therefore to *an indefinite lapse*

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\* MacCulloch, as quoted by Revd. J. Gray, in “The Earth’s Antiquity,” p. 57,—and Revd. J. P. Smith, on Geology and Scripture, *passim*.

*of time*, that we must refer for an explanation of the phenomena presented to our notice,—but to *the operation of forces acting with a rapidity and intensity immeasurably superior to any of those now observed by us*. That agency of this nature, far more powerful than any which we now witness, has been frequently employed during the earlier periods of the Earth's history, is attested by every observer, and nowhere more convincingly than in Murchison's admirable work on "the Silurian System." "Is it possible"—he asks,—“to contemplate the scenes of dislocation, where mountains have been severed, and their parts, once continuous, hurled into distinct ridges, and separated from their parent masses by vast intervals, without feeling astonishment at the intensity of the forces which were employed? Who can view the promontories and valleys of elevation shattered by great transverse fissures, without wondering at the means employed in their production? In them, not only have we proofs that the solid strata have been heaved up on lines both parallel and devious, but also that they have been snapped asunder by numberless rents and cracks, some of which have become deep chasms occupied by rivers. How have the coal fields been rendered accessible to man's use? Have we not shown that many have been forced to the surface by volcanic action, and that some



have assumed a basin shape, in consequence of their margins having been thrown into that form by a number of violent upcasts of the subjacent solid masses, which, wrenched from their original position, now converge towards a common centre? Need we recapitulate those curious changes in the lithological character of the deposits affected by igneous action; or endeavour to rouse the mind to a sense of the greatness of those powers, whatever they may have been, which produced the symmetrical jointed structure of mountains, and carried countless lines of parallel cleavage throughout regions of slaty rocks, in spite, as it were, of the original forms of the strata? Further, may we not advert to the striking phenomena which portions of this region exhibit, *of the complete reversal of a whole range of formations?* Can any thing be more startling than the fact, that *for many miles the stratified masses have been so completely overturned, that the last accumulated have been placed under those of anterior formation?* Is it not difficult to comprehend how the upheaving force could be so intense, that such sedimentary masses should be first elevated into vertical positions, and then overturned, or bent back upon their axes? The mere announcement of these grand changes gives us a full perception of the magnitude of the scale and power of the forces employed; and we see in them a

cause fully adequate to account satisfactorily for many of the results described under the head of drifted materials. In conclusion, we would observe *that abundant proofs have been adduced to show that the forces employed in dislocating the crust of the Globe were of extraordinary intensity.* These well registered phenomena are, we contend, *absolutely inexplicable* without the intervention *of paroxysms infinitely greater than any of which modern times furnish examples.*"\*

All these facts, then, speak loudly in favour of a rapid accumulation of the strata, from the lowest to the highest of the fossiliferous series; and the presence of numerous remains of such frail bodies, as insects, in "the tertiary gypsum of fresh-water formation at Aix, in Provence," and "in the tertiary brown coal of Orsberg on the Rhine,"† likewise bears testimony to the same fact. While "the circumstances, under which the (tertiary) fossil fishes are found at Monte Bolca, seem to indicate that *they perished suddenly* on arriving at a part of the then existing seas, which was rendered noxious by the volcanic agency, of which the adjacent basaltic rocks afford abundant evidence. The skeletons of these fish lie parallel to the laminæ of the strata of the calcare-

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\* Murchisons' Silurian System, p. 574.

† Buckland's Bridgewater Treatise, p. 412.

ous slate; *they are always entire* and so closely packed on one another, that many individuals are often contained in a single block. The thousands of specimens which are dispersed over the cabinets of Europe, have nearly all been taken from one quarry. *All these fishes must have died suddenly on this fatal spot, and have been speedily buried in the calcareous sediment then in the course of deposition. From the fact that certain individuals have even preserved traces of colour upon their skin, we are certain that they were entombed before decomposition of their soft parts had taken place.*"\*

Again, we are told that "beautifully silicified stems of palm trees abound in Antigua and in India, and on the banks of the Irrawadi, in the kingdom of Ava;"† and in reference to some of these, De la Beche assures us that "there are specimens where the silica has protected the fronds of palms, or something analogous to them, in their unexpanded state, from decomposition *after it had commenced.* Now, as these plants from Antigua are of kinds, indicative of a warm climate, this infiltration of silica, arresting decomposition, *must have been rapid,* and the plant *must have passed very quickly* from the conditions under

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\* Buckland's Bridgewater Treatise, p. 123.

† Ibid, p. 516.

which it grew, to those where it received at least its first protecting coat of silica.”\*

“ The fossil bones, found in the gypsum quarries near Paris, are light and porous, and appear to have been scarcely penetrated by gypsum. This is very remarkable, for if we suppose the gypsum to have been held in solution by water, like the sulphate of lime in recent springs, it seems extraordinary that it should not have penetrated into the pores of the bones. I am not aware that the circumstance has before been noticed by geologists, but I think the state of the bones proves, *that they were rapidly enveloped by the gypsum, before the animal matter in the pores was decomposed; and also, that the gypsum was speedily consolidated.* The same observation would apply to the bones of land animals I found in the fresh-water limestone under the volcanic mountain of Gergovia, in Auvergne; the state of these bones was similar to those in the Paris gypsum.”† Here then it seems proved that the gypsum is not due to a slow precipitation from the waters through the lapse of much time, but was rapidly produced by the chemical agency of volcanic forces, and, like the chalk and other limestones, was speedily consolidated.

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\* De la Beche's Theoretical Geology, p. 282.

† Bakewell's Introduction to Geology, p. 384.

That the destruction of the large terrestrial mammalia of the upper tertiary deposits was speedily effected, is abundantly proved by the occurrence of some of them, not many years since, imbedded in the frozen regions of Siberia, not only with the skin and bones entire, but actually possessing the flesh in such a state of preservation, as to serve for the food of dogs and other carnivorous animals; a condition which could not possibly have been preserved unless the carcasses had been instantaneously frozen, and, as it were, hermetically sealed from decomposition, in the ice in which they were incased.

Thus then it would appear, from the statements of every observer, that each formation furnishes conclusive evidence of the speedy accumulation of its strata. From the silurian rocks upwards through the old red sandstone, mountain limestone, coal-measures, saliferous system, lias, oolite, chalk and tertiary deposits,—we have gleaned, in turn from each abundant proof in the perfect preservation of many of their fossils, and from the frequent intrusion and admixture of volcanic substances, that the accumulation of the whole series, so far from demanding the millions of years which geologists would assign for its production, has been in general extremely rapid, and often instantaneous; and consequently that the “unlimited drafts upon antiquity,” which have hitherto been

made, should be abandoned; and that effects which have long been referred to causes operating through immense periods of time, may now be more truly attributed to the more orthodox agency of intense volcanic forces.

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## CHAPTER XXX.

GEOLOGICAL ARGUMENTS AGAINST THE UNIVERSALITY OF THE DELUGE ; OBJECTIONS TO A PARTIAL DELUGE ; GEOLOGICAL ARGUMENT REFUTED ; EDEN OBLITERATED BY THE DELUGE ; PROOFS FROM SCRIPTURE ; ERRORS ARISING FROM THE DIVISION OF THE TWO FIRST VERSES OF GENESIS ; EXISTING POSTDILUVIAN VEGETATION CREATED IN FULL MATURITY OF STRUCTURE ; INQUIRY INTO THE TRUE AGE OF THE WORLD ; SEPTUAGINT VERSION ADOPTED ; THE CHRONOLOGY OF HISTORY AND CHRONOLOGY OF THE EARTH PROVED TO BE IDENTICAL.

It has been urged that the Flood could not have been universal, because there are trees now growing in Africa and America, whose age must carry us back to "dates long prior to the Noachian Deluge. Of the Baobab (*adansonia digitata*) a tree of stupendous magnitude growing in Senegal and other parts of Africa within the tropics, one specimen has been subjected to the process which scientific men of the first ability have invented, and the age has been brought out to be 5,232 years; a still higher antiquity is claimed for the taxodium (*cupressus disticha*) an American tree; one now growing in the churchyard of Santa Maria de Tesla, near Oaxaca, in Mexico, is affirmed by M. De Candolle to go back certainly to the origin of

the present state of the world.”\* Further, because many volcanic hills in Auvergne “consist of, or are coated with pumice stone and other loose and light substances, which every person knows to be volcanic products,”—it is said to be,—“self-evident that these could not have withstood the action of a flood without having been broken down and washed away with the first rush of water. Either, then, the eruptions which produced them, took place since the Deluge; or that Deluge did not reach to this part of the Earth.”† In furtherance of these views, we are told to suppose “the seat of the antediluvian population to have been in Western Asia, in which a large district, even in the present day, lies considerably below the level of the sea; and in order to inundate this tract, we are further to suppose, that the bed of the Persian and Indian seas was raised, or the inhabited land subsided, until its hills were covered, and all living beings within its limits, except those which were preserved in the Ark, were destroyed. The draining off of the waters is then supposed to have been effected by a return of the bed of the sea to a lower level, or by the elevation of some tracts of land, which would leave channels and slopes for the larger part of the water to flow

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\* Revd. J. P. Smith on Geology and Scripture, p. 440.

† Ibid, p. 148.



back into the Indian ocean, while the lower part remained a great lake, or an inland sea, the Caspian.”\*

That a partial inundation could have been produced by such means, is unquestionably true; the point to be ascertained therefore, is, whether *the assumptions* of geologists are to be received in preference to *the asserted facts* of Scripture.

Now, the Bible, as previously pointed out, clearly and distinctly declares that “*all the high hills that were under the whole Heaven were covered,*” to the depth of 22 feet, “*and the mountains were covered;*” which would seem at once to decide the question in favour of the universal prevalence of the Flood.

The reverend author above quoted, has endeavoured to show that in Scripture phraseology “*universal terms* are often used to signify only a *very large* amount in number or quantity.” He then quotes various passages in proof of this fact; yet it is remarkable that in none of the many instances brought forward, is *universality* so clearly and decisively indicated, as in that which has reference to the Flood;—the only one, indeed, which appears to make the least approach to it, is that which says, “this day will I begin to put the dread of thee and the fear of thee upon the nations

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\* Revd. J. P. Smith on Geology and Scripture, p. 303.

that are under *the whole Heaven*;"\* but here "the whole Heaven" is clearly *restricted* by the context, to mean the whole Heaven which covered *those lands to which allusion is made in the preceding verse*, and does not apply to the Heaven which *surrounded the Globe*. "Rise ye up, take your journey, and pass over the river Arnon; behold, I have given into thine hand Sihon the Amorite, king of Heshbon, *and his land*; begin to possess it, and contend with him in battle. This day will I begin, &c." Here we have the meaning of "*the whole Heaven*" explained and determined by the allusion to *particular lands*, and we see in the passage no more than an exhortation against fear of the enemies with whom the Israelites had to contend, and a promise to strike terror into the hearts of those enemies. And so indeed is it in every instance quoted, for the true meaning and extent of the words "*all*," "*every*," "*the whole*," is positively determined by some part of the context. "Ye shall be plucked from off the land whither thou goest to possess it. And the Lord shall scatter thee among all people, from the one end of the Earth even unto the other;"† a prophetic description of the dispersion of the Jewish people,

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\* Deut. ii., 25. ("*all the heavens*,") as quoted by the Revd. J. P. Smith.

† Deut. xxviii., 63, 64.

as the punishment of their apostacy from God and rejection of the Messiah; “but no one”—says our author,—“can regard the expression as denoting a proper geographical universality.”\* No, certainly not,—but why? simply because, as he has himself previously admitted,—the Jews had no idea that the Earth was a spheroid. In their opinion it was a flat plain, and the “*all people*” alluded to by the prophet,—were the nations inhabiting the then known world. Yet although such was the sense in which the prophet and the Jewish people understood the threat, it by no means follows that its true import did not extend to the whole actual Earth; for they may yet spread into regions which were then uninhabited and unknown! The actual meaning of the prophecy, and the extent to which they accepted it, may be very different; and yet if they believed that the countries and the people of whom they had any knowledge, either personally or by report, constituted the whole Earth,—it is evident that the import of the prophetic denunciation was to the full as explicit as, and far better suited to their comprehension than, if it had more clearly specified, “a geographical universality” such as we should now understand it. And the same may indeed be said in regard to the threatened Deluge,

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\* Revd J. P. Smith on Geology and Scripture, p. 297.

for while, in the opinions of the Jewish people, the inundation would have embraced *the whole Earth*, as they understood the phrase,—it may yet, —and no doubt ought by us to be understood to have reference to *the Globe* as we now know it to exist; for it would have been a folly to have explained the true nature of the event to minds, which from their imperfect knowledge, would have been incapable of comprehending the truth. While therefore “the whole Earth” would signify to them, *the whole plane*,—to us it signifies *the entire Globe*. This seems proved by the words, “from *the one end* of the Earth, even unto *the other end* of the Earth;”—for to a plane such as they believed the Earth to be, the words are applicable; whereas to a spheroid they are inapplicable.

Again, the Bible informs us that “all flesh died that moved upon the Earth, both of fowl, and of cattle, &c., all in whose nostrils was the breath of life, died.” But had the Deluge been only a partial inundation, affecting a particular district or country,—what was there to prevent “*the fowl of the air*” from winging their way across the rising ocean, as many do still, from the gradually sinking or subsiding land, to the shelter and security afforded by the surrounding untroubled regions? The flooded land would have been gradually converted into sea,—but the aquatic birds

would have swam securely on the bosom of the rising waters, until hunger prompted them to seek the neighbouring shore. What again would have prevented some of those living creatures which inhabited the borders of the sinking district from effecting a landing on the unflooded and contiguous tracts? Where, moreover, was the necessity for building an ark to receive Noah and his sons, when they could all have travelled from the condemned districts to a place of safety during the 120 years which elapsed between the warning and the Flood? Or why, since the flooding of the country was so extremely gradual and unaccompanied by violence as to leave no trace of its effects behind,—did not some of the rebellious race betake themselves to neighbouring lands, when they saw the threat about to be fulfilled, in the commencement of “*the forty days*” of rain?

Again, it is to be observed, that on the subsiding of the waters, we received the distinct promise that “neither shall there any more be a Flood to destroy the Earth;” and this may lead us to a correct interpretation of the event, since the promise undoubtedly had sole reference to that particular kind of Deluge, which had just subsided, whether partial or universal. Now we know that partial inundations have repeatedly occurred since then, causing the devastation and destruction of the tracts over which they passed.

“The marsh islands between the rivers Elbe and Eyder are mere banks, like the lands formed of the “warp” in the Humber, protected by dykes. Some of them, after having been inhabited with security for more than ten centuries, have been suddenly overwhelmed. In this manner, in 1216, no less than *ten thousand* of the inhabitants of Eyderstede and Ditmarsch, perished; and on the 11th of October, 1634, the islands and the whole coast, as far as Jutland, suffered by a dreadful deluge.” Again, “in the year 1634, on the evening of the 11th of October, a flood passed over the island of Northstrand, whereby 1,300 houses, with many churches, were lost; *fifty thousand head of cattle perished*, and above *six thousand men*.” “Peru was visited, on the 28th of October, 1746, by a tremendous earthquake. The ocean twice retired and returned impetuously upon the land: Lima was destroyed, and part of the coast near Callao was converted into a bay; four other harbours, among which were Cavalla and Guanape, shared the same fate. The number of inhabitants in the city of Callao amounted to *four thousand. Two hundred only escaped*.” “There are several records of prior convulsions in Peru, accompanied by similar inroads of the sea, one of which happened 59 years before (in 1687) when the ocean first retired and then returned in a mountainous wave, *overwhelming Callao and its environs with*

*the miserable inhabitants.* This same wave, according to Lionel Wafer, carried ships a league into the country, and drowned man and beast for fifty leagues along the shore." "In May, 1787, a dreadful inundation of the sea was caused at Coringa, Ingeram, and other places, on the coast of Coromandel, in the East Indies, by a hurricane blowing from the N. E., which raised the waters so that they rolled inland to the distance of twenty miles from the shore, swept away many villages, drowned more than 10,000 people, and left the country covered with marine mud, on which the carcasses of about 100,000 head of cattle were strewed."\*

Such instances of partial or local deluges, involving the loss of life to man and beast within their influence, might be multiplied *ad infinitum*; these then are not the inundations alluded to in *the promise*; so that, if partial floods are not included in *the covenant*,—then is it clearly self-evident that *the Mosaic Deluge was universal*.

Again, there is, in the covering of the mountains, by the mode of *depression*, a palpable attempt to evade the true meaning of the Scriptures, in order that the assumptions of geology may be established,—for if *depressed*, those hills and mountains were *removed*, and were no longer in exis-

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\* Lyell's Principles of Geology.—See Deluges—Earthquakes.

tence as such;—how then could the waters have stood 22 feet above that which was not? The very term “*high hills and mountains*” proves that they were towering up above the land,—for such term would have been wholly misapplied had the high lands sunk down; inasmuch as, even if only partially depressed, they would no longer have been entitled to be called *high hills and mountains*. If then the inundated district sunk down or subsided, as suggested by the Revd. J. P. Smith, the Scripture statement would be totally inapplicable;—or if the hills and mountains of that district were covered—then must the Flood have extended far beyond the limits he would assign to it, and be universal,—for as long as they remained, no *partial* deluge could have covered them; and if they sunk down, they ceased to be high hills and mountains; a fact which, if the Bible be correct, and the water prevailed as therein stated, at once determines the Deluge to have been universal.

From the allusion, in Genesis, to the supposed site of Eden, it has been argued by some writers, that the rise and fall of the Deluge were so gradual and unaccompanied by violence, as to leave little, if any trace, of its occurrence on the submerged lands. Granville Penn, however, has very clearly shown the great probability of that passage having been nothing more than a



marginal note or gloss, subsequently introduced into the text.\* This view is rejected by the Revd. J. P. Smith, who nevertheless clearly proves by his own account of the Deluge that all traces of the spot must have been obliterated by that event, a fact which adds materially to the probability, if indeed it does not establish the truth, of Mr. Penn's conjecture. Eden, according to the Revd. J. P. Smith, was situated in "a part of Asia, lying between the Caucasian ridge, the Caspian sea and Tartary on the north, the Persian and Indian seas on the south, and the high mountain ridges which run at considerable distances on the eastern and the western flanks; here man was first created, and for many ages afterwards, did not extend his race beyond these limits."† But since we are afterwards informed that this tract of country was inundated by the rising of the bed of the Persian and Indian seas,—or by a *subsidence of the inhabited land towards the south*; and that subsequently the waters were drained off by the re-sinking of the ocean's bed, or by *the elevation of some tracts of land*,—it becomes perfectly evident that these *subsidences, elevations and inundations* of land, must have totally changed the face of the country, so as to render it quite im-

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\* Penn's Comparative Estimate.

† Revd. J. P. Smith on Geology and Scripture, p. 276.

possible to point out which had been the true site of Eden. Now, the Scripture, in declaring that the Earth was overwhelmed by a flood, by no means leads us to believe that the habitation of the wicked race which had been destroyed, was again laid bare by the retirement of the water,—but, on the contrary, that it *did not* re-appear,—for we find St. Peter expressly declaring that “the world which then was,”—that is,—the inhabited portion of the world,—“being overflowed with waters,—*perished* ;” a statement which is confirmed by that passage in the Revelations, wherein, alluding to the judgments of the last day,—it is said that “the sea shall give up the dead that are in it ;” so that Eden being a portion of the primeval land, is now lost beneath the ocean. Consequently whether the Deluge was local or universal, the land of Eden would in either case have perished.

But there is abundant reason to believe that by “the Garden of Eden,” was not actually meant any particular spot or country of the Earth,—but, on the contrary, that it is a figurative mode of expressing that state or condition of excellence, purity and happiness, in which man was created ;—for it is remarkable that wherever the original Eden is alluded to in Scripture,—it is made equivalent to pleasure, happiness, abundance,—in the same sense as we use the word Paradise. In proof of this see Genesis xiii., 10, Isaiah li., 3, and

Joel ii., 3. And besides this, the very fact that the Eden pointed out in Genesis ii., 8, was *an inhabited land in Syria*, should at once convince us that it was not, and could not be that Eden in which Adam was first placed,—because from that, he and his descendants *had been banished*; he was “sent forth from the Garden of Eden, to till the ground from whence he was taken,”—and being driven out, the Lord “placed at the east of the Garden of Eden cherubims, and a flaming sword which turned every way, to keep the way of the tree of life.”\*

Here then is proof that if Eden was truly a country,—neither Adam nor his posterity were intended to return to it,—and therefore that the Syrian Eden, which is mentioned in Genesis ii., 8, and in Amos i., 5, *was not* the original Eden. Consequently it amounts almost to positive proof that Mr. Penn’s surmise was well founded, and that the description of the Syrian Eden was placed, at an after period, as a note in the margin, by some commentator who was misled by the identity of name,—and that it became subsequently incorporated with the text.†

But here again it is fully apparent that the desire to prove that the Deluge was of limited

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\* Genesis iii., 24.

† Mr. Penn gives *proof* that the alleged ‘troubling of the waters in the pool of Bethesda,’—arose from a similar incorporation of a marginal note.—See *Comparative Estimate*.

extent and unaccompanied by violence, arises altogether out of the erroneous separation of the two first verses of Genesis,—by which, all the animals, whose remains are now found in a fossil state, are not only supposed to have lived and died previous to the present distribution of land and sea, but likewise to the creation of man. This false step, by creating difficulties in regard to the quantity of water required to submerge existing mountains, at once renders it necessary to declare that the Deluge was partial; whereas, by uniting those verses, and allowing them to refer solely to the pristine condition of the Earth's material elements,—all these difficulties are obviated, and the subsequent events recorded in the Scriptures are rendered plain and natural. According to this latter interpretation, therefore, the lofty mountains of the present day, are seen to be postdiluvian,—and the volcanic hills of Auvergne, above cited, as affording evidence in their accumulations of pumice and scoriæ, that the Deluge did not extend to that part of the world, are postdiluvian also.

In regard to the trees of Africa and America, on whose great age so much stress has been laid, it must be evident, that as the Deluge is proved to have been universal, they could not have remained “covered with water for three quarters of a year without being destroyed;” they too, then, like all other existing vegetation, must be

postdiluvian creations, and therefore like the olive tree of which we read, they were produced in full maturity of structure.

At what particular stage of growth such new creations may have been furnished, it is perhaps impossible to determine, but enough is gained if we admit them to have been sufficiently mature to bear fruit and so be able to perpetuate their kinds, agreeably to the terms of a similar mandate issued on the third creative day, when the Earth brought forth "the herb yielding seed,—and the fruit tree yielding fruit." That such was the mode adopted with all *original creations* is made manifest in the case of every organic being; and yet each of these, at the very moment of its first production, would, according to our ideas, have indicated a growth of several years; whether each elephant was created of an age which enabled it to subsist upon a vegetable diet only,—and altogether independent of a parent's care,—or was sufficiently mature to multiply its species;—and whether each tree was then at a stage of growth which in the present day would be held to be indicative of the first year of its bearing fruit, or otherwise,—it may not be easy to determine, although from the terms of the several mandates in the first week of creation, it seems most probable that one and all were sufficiently mature to carry on the work of generation, inas-

much as all are desired to “be fruitful and multiply and replenish the Earth.” Adam, therefore, was neither boy nor youth, but a man of mature age, and although, according to our common parlance, only one day old, yet his appearance and structural development would have indicated a growth of many years. Thus too, must it have been with that vegetation which was provided for the sustenance of himself and the brute creation, and had he then on the sixth day, examined the structure of the trees by which he was surrounded, with the scrutinizing eye, and *in the spirit*, of a modern naturalist, and applied to them those tests of age, to which we now resort,—he might have declared that they must have grown on the spot where they stood for many years before he was created, *with quite as much truth*, as philosophers now pronounce the trees of our present Earth *to be older than the Deluge*.

It must be observed, moreover, that the calculations founded upon the number of rings of annual growth in the wood, are said to be open to many objections,\* and that the late Sir J. E. Smith and Dr. Lindley, two of our most eminent botanists, have expressed their doubts as to the correctness of this mode of calculation, which at the best can only furnish an approximation to the truth. Geolo-

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\* Penny Cyclopædia, Adansonia.

gists are disposed to disregard these objections, as is invariably their wont in all matters which tend to throw a doubt upon their extravagant system of chronology—yet combining the chance of error in such calculations with what has just been urged, it is evident that the probabilities are in favour of the strict truth of the Scriptural account, and therefore that the present vegetation, with the exception perhaps of some useful grains preserved by Noah, is entirely a new creation adapted to the postdiluvian condition of the Globe. The age of the tree above alluded to, is given as 5,232 years; from which circumstance the Revd. J. P. Smith endeavours to show that, according to Archbishop Usher's system of chronology, "which the Christian world generally consents to use, *because to depart from it would perplex us in our ordinary reading, (!)* that tree must have existed 1,045 years before the date of the Deluge; and according to Dr. W. Hales' system, 238 years previous to the same event."\* It will be necessary therefore to inquire into the correctness of these chronologies; for which purpose, as the point is one of some moment, we shall not scruple to extract somewhat largely, from a late work by Professor Wallace on "the True Age of the World."

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\* Revd. J. P. Smith on Geology and Scripture, p. 442.

“The chronological discrepancies,”—says this author, “between the Hebrew and the Septuagint, which amount in all to nearly fifteen centuries of difference in regard to the true age of the world, have occasioned disputes among the learned ever since the third century. The Christian Church, however, has always followed the longer computation of the seventy, from the earliest period of its history till the era of the reformation; while the Jewish Church has retained the shorter chronology of the Hebrew text from the second century till the present day. Archbishop Usher, the great modern authority in Chronology, endeavoured to fix and determine the true epoch of the birth of Christ from that text alone. Dr. Hales, a later and *more accurate authority*, made a similar attempt, founding his computation on the Septuagint. The whole period, from the Creation to the birth of Christ, whatever may be considered as its real extent, is generally divided by chronologers into six subordinate periods, called ages. The extent of the *first*, or antediluvian age, is ascertained from the text of Genesis v. 3—32, and vii. 6, by summing up the ages at which the Patriarchs begat their eldest sons, including the date of the flood from that of Noah. This amount is, according to the Hebrew text, 1,656 years,—according to the Septuagint version, 2,262 years; and according to the Samaritan Pentateuch,



1,307 years. This astonishing discrepancy, which is found in all the codices of the three texts, is a Gordian knot, which has puzzled the Christian Church for more than fifteen centuries! The difference of the three computations is the more remarkable, inasmuch as all the three texts are considered to have been very carefully preserved! The Samaritan Pentateuch rivals the Hebrew text in point of antiquity, and is reckoned by some to be the nearest to the true Mosaic text; while the Septuagint version is rendered almost sacred, by the authority of the Apostles and the early Fathers of the Church. Which then, is the true computation? The Hebrew computation has been followed in modern times chiefly on the authority of the Latin vulgate, which is said to have been translated by St. Jerome. The Samaritan computation has had comparatively few supporters;—while that of the Septuagint, *which was universally followed by the ancient chronographers and historians, both sacred and profane*, has never been wholly abandoned by the Church even to the present day.

With regard to the evidence of the two principal witnesses, it is manifest that the citations from the Old Testament, which are to be found in the New, are, in general, not only in more perfect accordance with the Septuagint version than with the Hebrew text; but they are more consistent with the general tenor of the Sacred Writings.

There is, on this account, therefore, an *à priori* presumption in favour of the accuracy of the numerical statements of the Septuagint.\* This presumption is strongly confirmed by a reference to several passages not at all connected with Chronology, of which the following are striking instances. Thus, the day on which God *ended*, that is, finished or completed the work of Creation, is said to be the seventh in the Hebrew, and the sixth in the Septuagint; but the latter statement is plainly the correct one, being confirmed by the context; see Genesis ii. 2, and i. 31. Again, the number of persons present at the Eisodus of Israel into Egypt, is said to be seventy in the Hebrew, and seventy-five in the Septuagint; but the latter number is unquestionably the true one, because it is confirmed by the New Testament; see Genesis xlv. 27, and Acts vii. 14. In general it may be observed, that the numerical statements of the Hebrew text, *in many places, differ materially* from those of the Septuagint, *and even from those of other places of that text, where we are certain, from the nature of the context, that they ought to be precisely the same.*

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\* "It is quite certain that the Greek version of the whole of the Hebrew Scriptures, now called the Septuagint, was in public use at least a century before the Christian era, and that the Evangelists and Apostles made citations from this version in the New Testament, in preference to the original text."—Wallace's True Age of the World, p. 4.

From the occurrence of such discrepancies as these, both in the original texts and the ancient versions, it is evident, that the authenticity of each numerical statement must be carefully examined *per se* and tested by the multiplied means for the discovery of the truth which we possess in modern times. Indeed, the extraordinary and multiplied collations of Hebrew manuscripts and editions of the Old Testament, accomplished by the indefatigable labours of Kennicott and De Rossi, have brought to light such a host of variations in the original text, as completely to put to flight the antiquated notion of the "immaculate purity" and "miraculous preservation" of the *Hebrew verity*, which was so long and so strenuously maintained by critics and divines, and which held fast its position in their hermeneutical canon, even so late as the eighteenth century."

After furnishing various tables and critical remarks to show the corruption of the Hebrew text, the author then resumes:—"The last argument we shall adduce here in favour of the Chronology of the Septuagint, is derived from the deliberate opinion of Dr. Kennicott. In his valuable posthumous work, entitled 'Remarks on select passages of the Old Testament,' p. 16, he says, "It has been proved from *Eusebius*, that some Hebrew copies" of the Old Testament, "having the *larger* numbers, existed in the fourth century; and

others, on the authority of *Jacob Edessenus*, as late as the year 700; whilst others much later, are mentioned in the Chronicle of *Ecchellensis*. Moreover it is acknowledged by biblical critics, that all the copies of the present Hebrew text were taken from manuscripts of date later than the ninth century; and, that the striking uniformity which all the printed editions exhibit, is to be attributed to the fact, that they were all copied from the same codex. Dr. Hales also gives citations from Eusebius, from the Jewish Targums, and from other works, in which decided reference is made to the *larger* numbers as they anciently existed in the Hebrew. In fine, Mr. Cuninghame in his 'Dissertation on the Apocalypse,' p. 535, fourth edition, proves, on the authority of ancient Jewish tradition, that Adam was *two hundred and thirty years old* when he begat Seth;\* consequently, by the argument *ex uno disce omnes*, we conclude that the whole of the *antepaidogonian* ages are correctly given in the Septuagint, and that the true extent of the antediluvian age is 2,262 years."

The reason why such discrepancy now exists, is to be found in the desire of the Jews to make it appear that He whom they crucified, was not the promised Redeemer; hence they corrupted

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\* The corrupted Hebrew text gives 130 years only.

their chronology, by abstracting from different parts a total of 1,500 years, in order to show that the true period of His advent, as predicted by the Prophets, had not yet arrived; and although they now acknowledge that that period has long since past, they perversely declare that their sins have prevented His appearing.

“ They did not attempt to shorten the genealogies, that is, to corrupt the Chronology of the Scriptures, till all the witnesses were dead who knew Jesus, and who had companied with them that were witnesses of His resurrection! But when they found afterwards that the Christians constantly proved out of the Septuagint, that Jesus was the Messiah, they had then a sufficient motive for shortening the genealogies, if they could make it appear from the Hebrew text, that our Lord had come about *fifteen centuries* earlier than the time fixed by tradition, and that as the Chronology of that text did not agree with the Chronology of the Septuagint, the epoch of the true Messiah’s advent had not yet arrived. They have accordingly continued to assert, in contradiction even to their own Scriptures, and up to the present day, that Jesus of Nazareth was not their Messiah.”\*

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\* Wallace’s True Age of the World, p. 5 *et seq.*: a work which will amply repay the reader.

Thus it would appear to be established on the authority of the most authentic version of the Scriptures, and of the most eminent chronologists of modern times that—

	<i>Years.</i>
From the Creation to the Deluge occupied a space of.....	2262
From the Deluge to the Birth of Christ, .....	3216
From the Birth of Christ to the current year, .....	1849
	<hr style="width: 10%; margin: 0 auto;"/>
Giving a total of years, .....	7327
	<hr style="width: 10%; margin: 0 auto;"/>

for the true age of the world, from the Creation to the present year. Hence it follows, since a period of 5,065 years has elapsed since the Deluge, that the Baobab tree, which is asserted to be 5,232 years old, must have been created of a size, which, according to the mode of computing age from the rings of annual increase, would have indicated 167 years of growth. Now allowing for errors in the mode of computing the supposed age of this tree,—or even admitting that no error has been committed,—it seems by no means unreasonable to imagine, that a tree, whose term of existence reaches to between *five and six thousand years*, may be late in coming to maturity, and consequently that it may so happen that the Baobab

cannot be considered of mature growth until it attains to an age of 150 or 200 years,—a number, indeed, which, considering the duration of the tree's existence, might well be deemed a state of infancy; and thus as Adam's structure may have indicated a growth of *twenty* or *thirty* years or more,—while yet he was *only one day old*,—so in like manner, may the *Adansonia digitata*, at the same age,—have indicated a growth of *one or two centuries*!

From these data, indeed, we might even attempt to show what may possibly have been the actual age, indicated by Adam's appearance at the date of his creation; for the present age of the Baobab tree will bear the same approximate relation to the stage of growth at which *it was created*, as Adam's age at the time of his death, bore to the stage of growth indicated at the period of *his creation*. This will be rendered more apparent by the following figured statement, namely, as 5,232 years, the present age of the Baobab tree, are to 167 years, the supposed stage of growth at which it was created;—so will 930 years, the age at which Adam died, be to the number sought.

The answer, in round numbers, being 30 years,\* or about the age of man's maturity.

But as the Revd. J. P. Smith assures us that “there is every reason to expect *many centuries*

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\* The actual amount being 29 years and 8 months and 10 days!

of further life to this tree,"—we will suppose it to reach an age of 5,500 years, and in this case, according to the above reasoning, Adam's appearance would have indicated a growth of twenty-six years;—while even if we extend the term to 6,000 years, we shall still find that his appearance would have indicated an age of twenty-four years, at the period of his creation!\*

Thus it becomes apparent that the age of this tree, or that of any other species,—so far from proving that the Deluge was not universal, actually corroborates the statements of the historian, by showing that its age and the chronology of Scripture coincide.

But, independently of all the arguments that have been adduced in favour of the literal truth of the Mosaic narrative,—the question of time seems capable of being tested upon other grounds.

It has already been shown that every organic being whose remains are found imbedded in the strata of whatever age, must have lived and died subsequent to the first day of Genesis, on which light was for the first time admitted to our planet. We have likewise adduced proof from

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\* There is something very remarkable in this result, inasmuch as it would show that the age of the *first* Adam coincided with that of Christ, the *second* Adam, at the time of His Baptism, when His Ministerial Life commenced, for St. Luke informs us that He then "began to be about *thirty years* of age."—Luke iii. 23.



the facts of astronomy, founded on the transmission of light from the Heavenly bodies, to show that the duration of the beginning, in which the materials were deposited, out of which the volcanic and primary rocks were subsequently elaborated, was no less than 1,900,000 years; and from these data we may now perhaps be enabled to determine what has been the lapse of time between the termination of that period and the current year.

It appears, according to Dr. Buckland, that "there are eight distinct varieties of the crystalline unstratified rocks, and twenty-eight well defined divisions of the stratified formations. Taking the average maximum thickness of each of these divisions, at 1,000 feet, we should have a total amount of more than five miles; but as the transition and primary strata very much exceed this average, the aggregate of all the European stratified series may be considered to be at least ten miles."\* Now, according to the views set forth in the earlier pages of this essay, it will be seen that all the primary and volcanic products belong to the period which elapsed previous to the first day of the Scriptures, while the sedimentary or fossiliferous strata belong to the subsequent periods; therefore, in estimating the time which has elapsed since the first day, we have only to consider the thickness of these

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\* Bridgewater Treatise, p. 37.

latter deposits. Consequently the primary or azoic divisions of Dr. Buckland's statement, which he appears to estimate at about one-half of the whole thickness, will have to be deducted; and we shall then have his remaining divisions or about *five miles* for the thickness of the rest. The question then amounts to this;—If half the mean diameter of the Globe, or 3,956 miles, *minus* five miles of fossiliferous strata, were deposited in 1,900,000 years, how long a time would it require to deposit five miles? The answer is 2,404 years, 5 months and 15 days.

But as this term is seen to embrace the whole of the tertiary or postdiluvian deposits, it will be necessary to inquire into the probable thickness of those strata. On this subject it must be observed, that much uncertainty prevails, “for some of the formations which contain exclusively the remains of marine animals in certain situations, contain in other situations river or lake shells, with wood and the bones of land animals. It is, therefore, probable that while the waters in one lake or basin might be saline, those in another lake might be fresh; and *two contemporaneous formations* may hence contain *very different organic remains*. As the London clay and plastic clay and sand, taken together, equal or exceed in thickness the beds of plastic clay, calcaire grossier, and gypsum in the Paris basin, the

London clay may properly be regarded not as identical with the calcaire grossier and gypsum, but as their geological equivalents. While the beds of limestone and gypsum were depositing in the Paris basin, the London clay might be deposited in the London basin; and this may explain why many species of marine shells in the London clay are similar to those found in the calcaire grossier.\* Now the Revd. J. P. Smith furnishes a table which shows a thickness of 2,520 feet for the whole series; but as this includes the strata both of the Paris and London basins which are held to be equivalent, it is evident that this amount will have to be reduced, a fact, indeed, which he has himself pointed out, since he informs us that "all the tertiary beds must not be understood as being successional; for many are mutually equivalents in different districts, for example, the London clay and the Paris gypseous rocks."† The thickness of the strata, as given by this author, who, be it remembered, leans wholly towards the indefinite chronology of modern geologists,—is, 1,000 feet for the London strata, and 360 feet for those of Paris. Retaining, therefore, the larger amount and expunging the lesser, the entire thickness of 2,520 feet will be reduced by

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\* Bakewell's Introduction to Geology, p. 369.

† Revd. J. P. Smith on Geology and Scripture, p. 374.

360 feet, leaving 2,160 feet for the remainder. It is even more than probable that many of the strata of Central France, would, on a careful examination, be likewise expunged, and the reader is therefore requested to bear in mind that this calculation can lay no claim to exactitude; for with such rough and uncertain data, an approximation to the truth is all that can be aimed at; still the coincidences elicited are so truly remarkable, that we may fairly venture to pronounce the Scriptural chronology to be undoubtedly the true one. The question then now stands thus:—If five miles of strata were deposited in 2,404 years, 5 months, and 15 days, how long a time would it require to deposit 2,160 feet? The answer is 194 years and 12 days!

Now deducting this period from the age found for the whole series, we have—

	<i>Years.</i>	<i>Months.</i>	<i>Days.</i>
	2,404 ...	5 ...	15
<i>Minus</i>	194 ...	0 ...	12
	———	—	—

Or ... 2,210 ... 5 ... 3 for the time which elapsed between the first day and the Mosaic Deluge; or an agreement, within fifty-two years, with the age assigned by the chronology of history! A trifling discrepancy, which, taking into consideration the extreme difficulty of obtaining an accurate measurement of the various

strata, may, in conjunction with what has already been urged, be fairly appealed to as affording positive evidence of the strict truth of the Scriptural chronology and of the total untenability of the indefinite and unorthodox chronology of modern geology.

Thus we have the historical and geological chronologies supporting and substantiating each other in the following satisfactory manner, namely,—

HISTORICAL CHRONOLOGY.

	<i>Years.</i>
From the first day to the commencement of the tertiary or postdiluvian era, .....	2,262
From the Deluge to the Birth of Christ, .....	3,216
From the Birth of Christ to the current year,.....	1849
	7,327

GEOLOGICAL CHRONOLOGY.

	<i>Yrs.</i>	<i>Ms.</i>	<i>Ds.</i>
From the first day to the commencement of the tertiary or postdiluvian era, .....	2,210	5	3
From the Deluge to the termination of the tertiary period, .....	194	0	12

From the tertiary period	
to the Birth of Christ, ...	3,021 11 18
From the Birth of Christ	
to the current year, .....	1849

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7,275 5 3

or a discrepancy of only fifty-one and a half years between the two chronologies and which moreover is seen to arise solely from the difficulty of obtaining an exact and accurate measurement of the various strata. Thus the coincidence of the conclusions arrived at by such very different means, is so truly remarkable as to fix this chronology as the true one;—and we are consequently at liberty to declare that the chronology of Creation engraven, in legible characters on the strata of the Earth, is absolutely and positively identical with the chronology of Scripture History, thus clearly and substantially proving, what every well-regulated mind will be prepared to expect,—namely, that the word of the everliving God is established beyond a doubt upon the testimony of His works.

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## CHAPTER XXXI.

## CONCLUSION.

AND now, reader, one parting word before we close the subject. There are those who would teach us to believe that it is "an overweening conceit in man to imagine this stupendous frame of the universe made for him alone;" that in short we are to consider the ordering of our system and the mighty convulsions which have shaken our planet, as wholly independent of and unconnected with ourselves. Yet surely it is but rational to suppose that the Earth on which we dwell, and the things by which we are surrounded, and which minister so materially to our necessities, have all been ordered and arranged with a view to our special benefit and welfare; for are we not told in the very outset of our history, that all terrestrial things were placed under the dominion of man and provided for his use? It is asked "do the magnetic effluvia course incessantly over land and sea, only to turn here and there a mariner's compass?" But is there nothing in the question which savours of that "overweening conceit" already deprecated? Does it not seem to argue that because we may happen

to know of no other effect produced by those magnetic effluvia, tending directly to the benefit of the human race, that *therefore* they *can* have none? Are we acquainted thoroughly with every law and operation of Nature, and is there nothing left for posterity to learn? Can there be presumption in the thought, that this material world of ours was framed expressly for our habitation, when we know that God so loved His erring creature, as to give His Son a sacrifice for our misdeeds? Would He who could thus offer so stupendous a mark of His regard, consider aught else "too noble" for us? Would He weigh the creation and the ordering of a world like this, all glorious and wonderful though it be, against the sufferings of His beloved Son? Or are not all things wholly insignificant in comparison of this? Had we received some minor good, and argued up from that circumstance that God would also give us this greatest boon, then might we fairly have been accused of presumption and conceit in so doing; but when we have already received a greater token of the Divine love, than it could ever have entered into the mind of man to conceive, we surely cannot justly be condemned, for supposing that all minor considerations have been ordered for our benefit likewise.



So far from being "unwilling" like an eminent modern writer,\* "to press the theory of relation to the human race, so far as to contend that all the great geological phenomena we have been considering were conducted *solely* and *exclusively* with a view to the benefit of man," we conceive that we ought rather to regard them as specially and intimately connected with his history, and to accept them as the unerring and faithful records of the truth of those Scripture statements regarding the transgressions and the punishment of our race. Of what, in short, is the Bible made up, if it be not in reality the record of man's *past* history and *future* prospects? From the beginning to the end, it discloses to us not only the deeds which man has done, and *the changes* which those deeds have caused to be operated upon *the Earth itself* "for his sake;" but it likewise points forward in language so clear and unmistakable, to the nature and condition of our future dwelling-place, as to leave no room to doubt that the geological events or revolutions which have occurred, and which may still occur upon the Earth, are inseparably connected with the history of fallen man;—and that they form, in fact, parts of one grand and comprehensive scheme, which shall terminate only with eternity.

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\* Dr. Buckland.

“Man’s deviation from his duty was a disorder in the moral system of the universe, for which nothing less than Divine wisdom could devise a remedy,—the remedy devised, nothing less than Divine love and power could apply. Man’s disobedience was in the moral world what it would be in the natural, if a planet were to wander from its orbit, or the constellations to start from their appointed seats. It was an evil for which the regular constitution of the world had no cure, which nothing but the immediate interposition of Providence could repair.”\* We are informed that Adam was created pure in mind, free from sin, and consequently immortal;—therefore is he said to have been created “in the image of God.” All things were freely bestowed upon him, and he was placed in a condition of ease and abundance, in some part of the primeval Earth, whose climates and productions entitled it to be called a Paradise or place of happiness. Upon the general grant, one solitary restriction was imposed as a test of his obedience. Under that trial he failed,—and became in consequence subject to death, and after death to everlasting punishment. “He was informed of circumstances of deterioration that were immediately to take place in his condition, and that after a life of hardship and toil, he should

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\* Bishop Horsley’s Theological Works, Vol. II., p. 398.

return to the dust, from whence he had been taken. Hope, nevertheless of a *final restoration* was held out to him, in the intimation contained in the terms of the curse upon the tempter, that, after a long enmity between him and the human race, his entire defeat would be accomplished by the seed of the woman. This was certainly but a reserved and obscure intimation of the Saviour; but the promise was very fully opened and explained by subsequent communications, and by the immediate institution of a form of worship, which consisted in symbolical rites, referring to the method of redemption by the blood and merits of the Incarnate Saviour. This history of the Fall is the basis of the whole religion of the fallen creature; and it is the principle of unity which makes one consistent whole of the various revelations and religious institutions of different ages. The patriarchal revelations; the call of Abraham; the mark set upon his family; the promises to him, his son, and grandson; the deliverance of the Israelites from the Egyptian servitude; the Mosaic dispensation; the lessons of the Hebrew prophets: are all only different parts of one grand scheme, for *the restoration of man*, by the gradual discipline of revealed religion, and by the merits of the Redeemer, from the ruin of the Fall. The Fall is the fact which is the basis of the whole superstructure, and unites the various parts, which, without

reference to a ruin by man's disobedience, and to a restoration by God's mercy, in a manner consistent with His justice, have no agreement or consistency the one with the other."\*

The changes produced in the physical condition of the Earth, consequent on man's transgressions, have already been pointed out in the preceding parts of this work, and it will therefore be unnecessary to notice them further; so that we may now confine ourselves to an explanation of those passages in Holy Writ, which have reference to the Fall and Restoration of mankind.

The doctrine of redemption by the Son of God, is one which although fully acknowledged by the Christian Church, seems little comprehended by the mass of Christians,—few looking upon it as teaching *the actual return* of man to the condition *from which he fell*,—fewer still imagining that *the Heaven* which forms the goal of all our hopes and wishes,—will be indeed a solid and material *Earth*. Yet that such will be the case is established beyond the possibility of doubt by various parts of Scripture; a careful perusal and collation of which, will place the matter in the following light. We learn from the Book of Life, that God created man in His own image, that is, pure in mind and free from sin, and therefore immortal.

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\* Bishop Horsley's Theological Works, Vol. V.

He created him with an immaterial and immortal spirit, united to a material, and while free from sin, immortal body. In this condition he was placed upon the solid and material Earth, which then was in perfect keeping both as to its climates and in its productions, with that blessed state which man himself enjoyed, and thus formed truly the smiling garden-like scene, which the Scripture aptly terms a Paradise or place of happiness. This state, as far as we can learn, would have been eternal, but for the disobedience of rebellious man, who, with the solemn warning and denunciation of death and punishment, still ringing in his ears, transgressed and fell, and with his innocence departed the happiness he had hitherto enjoyed. The awful curse of an offended God burst in dire vengeance on the smiling Earth, and rendered it thenceforward niggard of its fruits, unless wooed into productiveness by the toil and labour of the fallen race.

But God in His infinite mercy, had already devised a means of rescuing us from the penalty incurred; and had ordained that in after years, a second Adam should arise *to redeem* the world and *restore us* to the happiness we had forfeited. That man was Christ, who by taking upon himself our nature and suffering death upon the cross, *redeemed* and bought us with His blood, that by this sacrifice and propitiation He might *restore us*

to that state which we were originally created to enjoy. Thus as "by man came death, by man came also the resurrection of the dead. For as in Adam all die, even so in Christ shall all be made alive."\*

"With the reign of sin, began the reign of mercy. Thus early was it declared that the Messiah should come to destroy the *works* of the devil; and thus early was it announced that the Christ should *suffer* and enter into his glory! All the attempts of the wicked one for ages have never been able to obliterate this first and glorious prophecy of God from the remembrance of the human mind. Onward it has passed from father to son, and from patriarch to patriarch, gathering fresh vigour and clearness in its descent; brightly did it beam, even in the antediluvian age, through the righteous preaching of Enoch and of Noah; and having survived the Deluge, anew did it shine forth in the postdiluvian age, in the glorious anticipations of the ancient Idumean Prince, and in the Divine revelations vouchsafed to the great father of the Jewish nation."†

The facts to be considered then are these; man forfeited his purity and immortality, and incurred the penalty of death, and of everlasting

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\* 1 Corinthians, xv. 21, 22.

† Wallace's True Age of the World, p. 137.

misery after death. Christ died to *redeem* or *emancipate* us from this penalty, and *to restore* us to *that state in which Adam was created*.

“ Now in the events of Christ’s death and burial, and resurrection, we see the example of that which shall happen to ourselves. He expired on the cross, as man. His immortal Spirit was disunited from the body, and went into the mansion of such as die in the Lord, remaining there until he reassumed the body at his resurrection. In like manner shall we, when the hour cometh, also die. Our souls, thus divided from the bodies which they now animate, shall depart to the place assigned to them, and exist in a state of consciousness and sensibility, till the trumpet shall sound, and the empire of death shall be dissolved. Then shall the grave resign its prisoners, ‘ He who raised up the Lord, will also raise up us,’\* and our souls shall be once more united to the bodies which, by that power ‘ whereby he subdueth all things to himself,’† he shall restore.”‡ “ At the Resurrection, every man shall be as really and truly the same person that died, as in the morning he that awakes is the same person that went to sleep at night.”§ Now the resurrection of our *material* bodies,—which cannot reside in

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\* 1 Corinthians, vi. 14.

† Philippians, iii. 21.

‡ Sandford’s Lectures.

§ The Whole Duty of Man, p. 108.

*immaterial space*,—implies a material or solid habitation in the world to come; for the argument, sometimes used, that death will so change and purify our corrupt natures as to render the body totally different from what it now is, may be fully and utterly silenced by the fact of our Blessed Saviour having re-appeared upon Earth in the selfsame body which he possessed before His death, for the Apostles who conversed with Him frequently after his resurrection were satisfied He had a real body, by His eating and drinking with them. And one of them, moreover, searched the holes that the nails had made in His hands, and the wound in His side.\* His appearing in the body was, in fact, in a great measure for the express purpose of convincing His disciples of the truth of the doctrine, then only partially received, that the actual resurrection of the body, was as certain and as essential, as the resurrection of the soul. From which facts it becomes established that the resurrection of the body, in which, as Christians, we profess our belief, must mean the actual reuniting after death, of our material or corporeal substance, to our immaterial spirit, and as we know that it is contrary to reason and to possibility that such bodies can inhabit immaterial space, so we must necessarily admit

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\* Whole Duty of Man, p. 86.



that the future dwelling-place of man,—or the Heaven to which the Scriptures invite him, will likewise be a material or solid Earth,—in short that *new Earth* which St. John beheld in his vision. Of the truth of this fact we have evidence in Isaiah at the 17th verse of the 65th chapter, wherein we find these words;—“for, behold, I create new Heavens and a new Earth: and the former shall not be remembered, nor come into mind. And I will rejoice in Jerusalem, and joy in my people: and the voice of weeping shall be no more heard in her, nor the voice of crying. *And they shall build houses, and inhabit them; and they shall plant vineyards, and eat the fruits of them.* They shall not build, and another inhabit; they shall not plant, and another eat: for as the days of a tree are the days of my people, and mine elect shall long enjoy the work of their hands. They shall not labour in vain, nor bring forth for trouble; for they are the seed of the blessed of the Lord, and their offspring with them. And it shall come to pass, that before they call, I will answer; and while they are yet speaking, I will hear. The wolf and the lamb shall feed together, and the lion shall eat straw like the bullock: and dust shall be the serpent’s meat. They shall not hurt nor destroy in all my Holy Mountain, saith the Lord.”

Here then, is the return to the original blessed state, clearly shown in the fact that there shall be no more violence and injustice, neither pain nor sorrow,—but man shall live again upon a new Earth, in all the happiness of his pristine condition. Thus too, does St. John describe the same event; “and I saw a new Heaven and a new Earth: for the first Heaven and the first Earth were passed away; and there was no more sea. And I John saw the Holy City, New Jerusalem, *coming down* from God out of Heaven, prepared as a bride adorned for her husband. And I heard a great voice out of Heaven saying, Behold the tabernacle of God is with men, and He will dwell with them, and they shall be His people, and God Himself shall be with them, and be their God. And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain: for the former things are passed away.”\*

Now it is remarkable, as confirming the views above advocated, that nowhere is it said that man shall go and live with God, for this, as man is constituted, would be an impossibility. God is a Spirit who pervades all space, and the Heaven in which He dwells, is that blissful, and to man inconceivable, state of happiness which emanates

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\* Revelation xxi., 1—4.

from His own perfections. Material man, therefore, even in his regenerated condition, cannot possibly dwell with Him,—but He “will dwell with them, and they shall be His people,” and God Himself will reign in their hearts and be their God.

But it is said that we know not “what our ‘spiritual body’ will be like;”—“that it will be something essentially different from this natural, gross, terrestrial body,—and sustained by a different process of existence;”—“that it must be something better than Adam’s original and sinless body which he had in Paradise before the Fall.” and that “we are nowhere incited to look for a body restored to the image of the first Adam, but rather to that of the second Adam in his present glory!”\*

It becomes necessary then to ascertain what in reality was the nature of that body which the second Adam assumed at his resurrection,—for as that was,—so will ours be; His resurrection being in all things the example of our own.

Now the body which our Saviour had before His death was a natural and mortal body, subject to the same pains and sickness, decay and death, as these we now possess. He was murdered, and rose again,—possessing to all external appearance

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\* Revd. F. Close. *The Catholic Doctrine of the Second Advent*, p. 52.

the very same body in which He was crucified, for in order to convince his astonished disciples, that He was in very truth the selfsame Jesus who was slain, He exclaimed "Behold my hands and my feet, *that it is I myself*: handle me, and see; *for a spirit hath not flesh and bones, as ye see me have.*" And seeing that they still wondered, "and believed not for joy"—he continues, "Have ye here any meat? And they gave Him a piece of a broiled fish, and of an honeycomb. And He took it, *and did eat before them.*"\* Now herein do we see, not only that He was as truly a man, after His resurrection, as before His death,—but likewise that the body will be sustained by the same process as at present,—for as a spirit does not possess bones and flesh,—so neither does a spirit feed on material things; and that our bodies will be sustained in our future abode, as Adam's was previous to the Fall, is likewise shadowed forth in the 65th chapter of Isaiah already quoted.

That our "vile body" will be changed and fashioned like unto His "glorious body," is true,—but in what will that change consist? Assuredly only in a restoration of the body to its pristine condition, ere sin had rendered it corrupt and subject to mortality. It was originally incorrupt, —and, as being free from the gross and carnal

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\* St. Luke xxiv., 39.

propensities by which it is now polluted, it was in all respects a spiritual body, united to a spiritual or sinless mind, and *therefore* was man in the image of his Maker. It was the fall from this pure condition which rendered the body vile, corrupt and gross;—but death, through the sacrifice of the Redeemer, will free it from corruption and restore it to that perfect state in which it was originally created. Now in the doctrine which would teach us that “we are nowhere incited to look for a body restored to the image of the first Adam,—but rather to that of the second Adam in his present glory,”—we perceive both a misconception and a contradiction,—for the image in which Adam resembled God, was not in the fashion or nature of his corporeal frame, but in the purity of his immortal spirit;—while the image of the second Adam,—who is God,—is precisely the image of the first Adam, who was created in His likeness; a plain and satisfactory demonstration that as we are incited to look for a body perfected after the image of the second Adam, that body will *be restored* to the state of purity and perfection in which it was originally formed,—that is to say, that we shall be restored to the image of our Maker.

This view seems to derive support from what is said by St. Paul in his epistle to Titus, chapter 1, verse 2. “In hope of eternal life, which God, that cannot lie, promised *before the world began.*”

Now the first intimation of the redemption was made to Adam in Eden,—consequently “the world” here spoken of, must mean *the corrupt or present world*, from which we were to be redeemed,—and does not mean, *before Adam was created*,—for the covenant of redemption began only with the Fall.

Again, it has been urged, on the authority of St. Paul, “that flesh and blood cannot inherit the kingdom of God; neither does corruption inherit incorruption.”\* Assuredly not,—but the flesh and blood here spoken of, point only to the fact that the *carnal-minded* and *corrupt* cannot inherit the portion which belongs only to the *spiritually-minded* and *incorrupt*. The *mortal* bodies which we now possess cannot inherit *immortal life*,—but these same bodies *freed from mortality* by death, and rendered by redemption incorrupt, are thus changed and fashioned like unto Christ’s glorious body, which is glorious because perfect and immortal.

The fall from purity to corruption, from immortality to death, is the one great fact which renders our bodies vile and incapable of inheriting an abode in Heaven or happiness. Sin, so to speak, has had the chemical effect of converting the original glorious, because sinless, body into one of corruption and vileness; but when once that

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\* I. Corinthians xv., 50.

deteriorating agent is removed, by the efficacy of our Saviour's death,—these vile bodies will be once more pure,—and being “sown in corruption, will be raised in incorruption.” But if that body in which Christ re-appeared to his disciples, be not in truth the glorious and immortal body in the likeness of which we also shall arise,—what means the Scripture where it says—“it is sown in corruption, *it is raised* in incorruption.” Here is a positive declaration, nor is it the only one,—that the mortal and corrupt body, which is laid in the grave to be resolved into the elements out of which it was formed, will rise again *from that grave restored* to its pristine state of immortality and incorruption. And this is proved by what is written in the previous portion of the same chapter, where St. Paul, in answer to the question “How are the dead raised up? and with what body do they come?” exclaims “Thou fool, that which thou sowest is not quickened, except it die : and that which thou sowest, thou sowest not that body that shall be, but bare grain, it may chance of wheat, or of some other grain : but God giveth it a body as it hath pleased Him, and to every seed his own body. So also is the resurrection of the dead. It is sown in corruption ; *it is raised* in incorruption ; it is sown in dishonour ; *it is raised* in glory ; it is sown in weakness ; *it is raised* in power : it is sown a natural body ; *it is raised a*

*spiritual body.*”\* “ Thus as corn which is sown, rises in the same nature, though not in the same figure, in which it was sown,—so, in like manner, shall our bodies arise the same in substance, though not in quality; for in its present state, it is subject to death and dissolution, to disgrace and deformity, to infirmity, decay and impotence; and it is ‘a natural’ or an animal ‘body,’ suited to the wants of this lower, sensible, animal state in which we now live: but in its future state it will be incorruptible, glorious, vigorous and spiritualized by an exemption from its present imperfections, and by the acquisition of numerous perfections, which it will continually employ in subjection to the soul.”† We are not taught that the mortal body shall arise and *be converted* into a glorious or regenerated body,—but that it shall *rise* or be “*raised*” in incorruption,—“*in a moment, in the twinkling of an eye,* at the last trump: for the trumpet shall sound, and the dead *shall be raised incorruptible*, and we [the living] shall be changed. For this corruptible must put on incorruption, and this mortal must put on immortality.”‡ And why? Because death, through the merits of the Redeemer, being “swallowed up in victory,” will no longer hold dominion over it. And thus, as sin converted the

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\* 1 Corinthians xv. 35—44. † Burkitt. ‡ 1 Corinthians xv., 52.



immortal and perfect frame, into one of mortality and corruption, so the blood of Christ once shed, will have redeemed and restored that frame to what it was. What, then, it may be asked, are we to understand by Christ's Transfiguration and glorious ascension? Both, we reply, were simply intended as manifestations of Christ's Divinity,—for we must remember, that He stood on Earth in the double character of God and man. The transfiguration in which both Moses and Elias appeared, was a vision more especially intended “to represent the cessation of the Jewish, and the commencement of the Christian dispensation.” Moses and Elias were undoubtedly most proper representatives of the Law and the Prophets; and when the three disciples saw these illustrious persons conversing familiarly with Jesus, they probably were confirmed in their opinion, that they were of equal authority with Him. But the gracious words which issued from the cloud most clearly explained the meaning of what was passing before the eyes of the disciples; “Hear ye Him, my beloved Son.” The conclusion too of the whole scene harmonizes with this declaration: Moses and Elias instantly disappear and “when the disciples lift up their eyes, they see no man, save Jesus, only.” The former objects of their veneration are no more; Christ remains, alone, their unrivalled and undisputed Sovereign. And besides this primary and imme-

diate design of the transfiguration, that event was perhaps intended to answer other purposes of great utility. Among others, it afforded a striking additional proof of the divine mission of Christ; for here was one of the few occasions in which God Himself was pleased, as it were, personally to interpose, and to make an open declaration from Heaven in favour of His Son. And besides this a particular attestation was given on the Mount to two of the principal doctrines of Christianity: a general resurrection, and a day of retribution. The visible and illustrious representation of these doctrines in the glorified appearance of Christ, and Moses and Elias, is appealed to by St. Peter, who saw it, as one convincing proof, among others that "he had not followed cunningly devised fables, when he made known the power and coming of our Lord Jesus Christ."\*

Again it is asked "will Christ, having now a 'glorious body' again take human flesh, again descend" from Heaven to reign on Earth? No, *not to reign* upon this Earth, but that He will again descend in His human flesh is certain, for are we not taught that in the last day He shall again appear on Earth to judge the world? *Human flesh* does not necessarily imply *mortal flesh*, for in the former Christ appeared to his disciples

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\* Bishop Porteus.

after His resurrection when death to Him was swallowed up in victory; His body saw no corruption, and therefore was raised in incorruption, but that it was still human flesh, though no longer mortal flesh He proved to demonstration. And does not Job exclaim, "I know that my Redeemer liveth, and that He shall stand in the latter day upon the Earth. And though after my skin worms destroy this body, yet *in my flesh* shall I see God." But as the Father and Son are one God, and God is an invisible and immaterial Spirit, it is clear that if we are *to see* Him at the latter day, He must appear to us again as God and man united, for in no incorporeal state can we possibly behold Him; but "we shall be like Him; for we shall see Him as He is."\* Here then is a proof that we shall rise at once with an immortal or glorious body, for being then by death and redemption rendered pure and spiritually minded ourselves, we shall be like Him, and therefore shall be able to "see Him as He is," that is, as our Saviour, God and man, for "no man hath seen God at any time,"† not even in purity before the Fall. As Christ, therefore, re-appeared on Earth after His resurrection, in the selfsame body, changed only in nature and not in substance, which He had before His death, so in that selfsame body will He come again to judge

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\* 1 John iii., 2.

† 1 John iv., 12.

the quick and dead; but then having fulfilled His mission as Redeemer and Judge, His character of Mediator, between God and man, will be laid aside, and He will thenceforward be to us what He really is, our Great and Merciful Creator and Father; and thus having restored His fallen creature to his pristine state of glory and perfection, He will continue to "dwell with him and be his God," as He was before the Fall, on that new Earth which we are told is in store for us.

The change therefore that death and redemption will have wrought in man, will be a change of spirit, a change from sin to virtue, according to that exhortation of St. Paul, whereby he enjoins us to "be transformed by *the renewing of our minds*, that we may prove what is that good and acceptable and perfect will of God."\* Thus as the first Adam, by his fall, changed the condition of our race, from that of virtue to one of sin and corruption, so the second Adam, by fulfilling the law which the first transgressed, will restore or reconvert us from sin to virtue and incorruption; the Fall and Restoration constituting in fact the whole scheme of our Religion; and to what condition, we would ask, can man aspire, more glorious than that which shall restore him to the image of his Maker?

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\* Romans xii., 2.

True "every description of the resurrection-body points to a state of glorious existence incompatible with this earthly frame of things;"\* but the difficulty implied in this remark, is at once removed, by the fact that the "earthly frame of things,"—like the bodies which inhabit it,—will be likewise changed and restored to its pristine condition of glorious perfection, and "a new world,—new Heavens and a new Earth, adapted to the new state of existence,"† will appear to replace the present system, which shall pass away; for "the day of the Lord will come in the which the Heavens shall pass away with a great noise, and the elements shall melt with fervent heat, the Earth also and the works that are therein shall be burnt up. Nevertheless we, according to His promise, look for new Heavens and a new Earth, wherein dwelleth righteousness."‡

Every consideration then tends to the unavoidable conclusion that man shall again inhabit a material and solid Earth framed in a condition similar, or even superior to that on which he dwelt ere sin had marred the face of Nature; and that he shall live in a state of happiness at present inconceivable, for "eye hath not seen, nor ear heard, neither have entered into the heart of man,

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\* The Second Advent.

† Ibid.

‡ 2 Peter iii., 10—13.

the things which God hath prepared for them that love Him."†

Thus too is it perfectly manifest, as we journey onwards through every stage of the vast and stupendous scheme unfolded for our consideration in the pages of the Book of Life, that the varying conditions and geological revolutions of our abode, have been dependent on our own transgressions, and that as this Earth was destined from the beginning to be man's dwelling-place through time, so, through the blood of Him who was slain that we might live, are the righteous destined to inhabit a far more perfect Earth, through a continuing and blissful eternity.

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† 1 Corinthians ii., 9.

THE END.

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