THE COMET:

OR,

THE EARTH, IN HER VARIED PHASES,

PAST, PRESENT AND FUTURE,

AS DEDUCED FROM THE HIGHEST AND MOST RELIABLE AUTHORITIES.

IN THREE PARTS.

COMETS MAY BLAZE UNSEEN, AND WORLDS DECAY,
WHILE ERROR LEADS, AND MAN PURSUES ITS WAY.

BY

Non Quis? Sed Quid?

A COMETITE.

NEW YORK:
E. J. HALE & SON, 16 MURRAY STREET.
PHILADELPHIA:
CLAXTON, REMSEN & HAFFELFINGER.
1869.

CLAYTON, STARR & LINDSAY,
STEREOTYPERS AND ELECTROTYPERS,
116 Fulton St., N. Y.

PREFACE.

THIS COMET, like all others, has truly unveiled itself, without any premonition of its coming. The author, long restrained of his liberty by a malarious foe, to relieve the tedious hours of his monotonous captivity, by way of pastime, concluded to write an Essay. With material all arranged, he indifferently seeks a subject, when the Comet suddenly flits across the mental view, and thereby secures the page. Thought following thought, and fact added to fact, rendered the pursuit deeply interesting, and enticed the writer far beyond his original purpose; for his pastime grew into a labor, and his Essay became a book. Having no theory to control him, but passively and progressively following whithersoever sound reason, philosophy and revelation should lead, his speculations attained a vista so unique and unfamiliar in character, yet so gravely momentous, and withal so palpably just and true, that in selfishly withholding it from others equally interested with himself, he feels that no amount of diffidence or distrust will justify him. Hence, undesignedly, the Essayist becomes an author.

The reader, however, in taking the book, must receive it with its many deficiencies. Begun simply as a recreation, it has been continued in a *revulsive* atmosphere of circumambient powders and potions,

sinapisms and lotions, and only in its pharmaceutical agencies distantly resembling Helicon. The several chapters, and even parts of the same chapter, have been disjointedly composed, with intervals of varying lengths, and, consequently, those happy unities of thought, style, temper and taste, which stern criticism demands, will often be wanting. But the book is not offered as a tribute to the Muses, nor as meriting their approbation; but is tendered to rational humanity, solely for the matter which it contains, and that, properly appreciated, it is hoped, will make ample amends for all other insufficiencies.

Covering, as it does, all that portion of Eternity known as Time, its narrow limits necessarily preclude a full and thorough discussion of the many subjects it treats upon; and it can only be accepted as a simple syllabus of suggestions, which others, more proficient and better prepared, may readily extend and finish. Many of the chapters would be expanded into a volume, and some of them into many volumes, were a full and complete exposition and demonstration of their several topics attempted. This course, however, would defeat its own purpose; and a mere synopsis, to awaken a train of thought in the right direction, and invite each reader to supply from his own store of knowledge and experience, accessory facts and proofs, will certainly accomplish more, by receiving the heartiest welcome. In recasting the work, the writer's purpose has been to produce, out of an abundant mass of material, an humble and unpretending manual, adapted to general circulation, and which all may read and understand. To this end no pains have been spared, and all mathemati-

cal illustrations and others of an abstruse and generally repulsive character, of which many parts of the book are eminently susceptible, have been studiously withheld. Believing that, although greatly condensed, the matter is within the grasp of the plainest minds, it is requested and suggested by the writer, that none shall feel dismayed, even if at the outset any portion of the subject may appear distasteful or unfamiliar; for a clear comprehension of the whole will vividly unfold very many important and interesting truths, well worth the pains bestowed upon their attainment.

It should be remembered that the author is not to be numbered with the theorists. He propounds no theory, he offers no hypothesis. He but unfolds the most ancient roll of time, and derives therefrom by careful analysis, a physical view of the earth and earthly things as they at first existed, together with a lucid account of their subsequent subversion. This view, although difficult to realize from its extreme dissimilitude to things at present familiar, is "compassed with so great a cloud of witnesses," that it must take rank with "the things that cannot be shaken." A remarkable combination of concurring proofs, found in the ancient roll itself, is referred to in the *first division* of the Book. The *second* part unfolds how thoroughly the broad expanse of nature confirms it: and the *third* part, in its limited citations, pointedly suggests that it is most amply recognized throughout the Scriptures. Nothing is based upon conjecture; but stern and stubborn physical facts, drawn from the venerable page of reliable and self-sustaining history, supported by science, philosophy

and revelation, constitute the whole scope of the work. Able theorists, and the learned advocates of ingenious hypotheses are cited as witnesses, and in all cases, where necessary, are allowed to narrate the facts and phenomena in their own way. Their conjectures may and do contravene the views presented in the book, yet their testimony, apart from theory, not only harmonizes with, but emphatically confirms them all. In most cases only the simplest modes of illustration have been adopted, and they not carried to their extreme and legitimate length, to adapt the work to popular use, and thereby many of the most conclusive verifications are necessarily omitted. These, however, may readily be supplied by the learned, if truly so disposed.

That the work will encounter opposition may readily be anticipated, for its very character seemingly invites if not provokes it; and from man's contentious disposition, such is the fate of even the most simple propositions. Yet the truths enunciated have nothing to fear from the fiercest conflict, as they stand too firmly supported by a solid and invincible host, to yield the victory, much less to tremble or retreat at the thought of an enemy. Such a contest the writer by no means solicits. The work was begun simply for his own entertainment, and is now offered to the public, not for honor or emolument, but purely to furnish a substantial but much needed buttress to the citadel of truth, on the side of its fiercest assault. That point gained, all the shafts of opposition will be permitted to fall harmless and unheeded.

CONTENTS.

PART THIRD

CHAPTER I.

ON COMETS.

> Needy knife-grinder! whither are you going?
> Rough is your road, your wheel is out of order;
> Bleak blows the blast—your hat has got a hole in't,
> So have your breeches.—CANNING.

WHENEVER a well-dressed stranger is found perambulating the streets of one of our country towns or villages, intense curiosity amongst its citizens is at once excited by his presence. A pause ensues in every department of village life. The housemaid rests upon the handle of her broom; the washerwoman leaves her tub; the clerk leaps the counter, and rushes to the door; and even the merchant quits his ledger to scan the dimensions of the visitor. Village society at once divides itself into two great classes: the one, most numerous, is satisfied with the humble position of inquirers, and wonder who he can be—where he is from, and what possibly may be the purpose of his coming? The other, assuming a greater degree of acumen and penetration, readily affirms, that he is only some speculator, some excise man, some Johnny Reb, run away from home for

stealing, or some accursed Yankee, come to rob us of our little store; yet, perchance, there may be found in this latter class a single one who, with more charity of heart, will venture to pronounce him a schoolmaster or a preacher.

Even so has it ever been with comets, those errant strangers of the skies. After the wise men of the East, the astronomers and astrologers of Babylon and Chaldea, had assaulted the heavens, and there firmly fixed their celestial fauna and flora; the two bears and the fishes, the whale and the twins, the great eagle, the lion and the crab, living in peaceful bliss side by side; and had foretold the coming and the going of the planetary orbs, the rising and setting of the sun, with the lunations of the moon, they won the unbounded applause of an admiring world. But chaplets of laurel oftentimes rest as uneasily upon the head as crowns of gold. A stranger comes to view, a comet in the heavens. The maid and the cook, the merchant and his clerk, pause from their labors and are gazing upon the wanderer. The zoological charts of the skies are produced, and thoroughly discussed, from the tip of the little bear's tail to Hadley's Octant, yet his place is nowhere found thereon, and the magi are consulted as to his nature and movements.

The wise men had seen such visitors before, and had labored in vain to read their eccentricities; to define their parabolic orbits, their perihelions, and radii-vectors; but all to no purpose. The ways of the Comet was a sore puzzle to them; but to make such a confession would tarnish their chaplets and humble their pride. So, with oracular dignity and

the nod of Burleigh—if such nods were known in those days—they told the humble multitude that these tailed monsters were the special messengers of Deity, sent to give notice of impending calamity; that Comets were most surely the harbingers of pestilence, of famine and war. If any were sceptical, resort was had to the inductive method; and known antecedents and consequents were appealed to, for the removal of doubts. Their manner and method we may suppose was somewhat after this fashion; there was the great Comet, in the year 1680, which was soon followed by those intestine commotions that ended in England's "glorious Revolution" of 1688. There were the two Comets of 1770 and 1772, that proclaimed the American Revolution, with its Declaration of Independence in 1776. There was the Comet of 1811, immediately followed by our war with Great Britain in 1812. And there was again that greatest of Comets, with its tail spanning one-third of the heavens, in 1858, traveling from North to South, that egregiously provoked the late Civil War; in which those Southern barbarians, laboring under every disadvantage, blockaded and hemmed in on every side, so fiercely contended for victory against the allied hosts of Europe and Asia, Africa and America.

With such logic as this, did the Magi address the weak multitude: and so deeply were they impressed with its truth, that no sooner did a Comet appear in the skies, than, yielding to inexorable fate, they seized on their weapons and rushed into war. This is the full measure of light, antiquity furnishes in relation to Comets.

Our modern philosophers, knowing what refractory

creatures they had to deal with, armed themselves with the most improved implements for the contest. Yet their achromatic lenses, in stupendous tubes, reflecting telescopes of mighty calibre, compared with which the great Armstrong gun and Rodman powder are but pigmy weapons, have failed to ensure the victory.

Conic sections, analytics, fluxions, square root, cube root, involution, evolution, perihelion, heliocentrics, and a host of extractive powers, have been tried, to elicit from these erratic creatures a confession of their ways and natures, but all without success. As a division of labor tends to perfection, several of our astronomers wisely took in charge each his own pet Comet, for their more close and familiar study. Mr. Encke, Mr. Halley, and Mr. Biela devoted many years of close observation upon their especial favorites, but have hitherto failed to secure for them such a reputation of steadiness, as to entitle them to a position in our common almanacs.

But then, it must be confessed that our astronomers are beset with many trying perplexities. Their calculations, no doubt, are all correct, and the Comets would return according to their predictions—if they could—but they are unable so to do, as "their motions are liable to great derangement from the attraction of the planets"—a most remarkable instance of which is cited in the Comet of 1770, one of those that foreshadowed or produced the American Revolution. Mr. Bexell, in that year, definitely fixed the period of its return at five and a half years; but it never returned—that was perplexing. Mr. Burckhardt several years afterwards unravelled this mystery and es-

tablished, that prior to 1767, this Comet had moved in a large orbit with a period of fifty years, so distant from the earth as never to be visible. But in the latter year, it entered within the regions of Jupiter, whose attractive powers detained the Comet and changed its period from fifty to five and a half years. That upon another trip, in 1779, she again fell in with Jupiter and passed so near him "that her orbit was greatly enlarged, and her period lengthened to twenty years, so that she no longer comes near enough to the earth to be visible."

Such intermeddling as this, it must be confessed, is truly vexatious to the man of science, and well calculated to perplex him. Yet it must remain unavoidable, so long as such an intriguing libertine as Jupiter rules in the azure realms, who, from the oldest time, according to pagan priests and poets, has ever exhibited similar foibles of his divinity. It is not surprising, therefore, that the ancient sages of Chaldæa and Babylon were so egregiously puzzled in their observations, as he, in their days, was young; neither is it a matter of wonder that our modern savans, of Europe, are now non-plussed by his tricks; as the gallant disposition of his youth is still manifest in his ways, so certainly and mathematically ascertained.

Our astronomers are clearly at fault, and are unable to define, in the least degree, the motions of the Comets. Yet they would fain have us believe they can, and assure us that if we will only wait, we shall certainly witness the fulfillment of their predictions. Yea, there's the rub. Pray, how long? Mark the answer: "The periods of most of them are told by

centuries, and of very many of them by tens of centuries." It is out of the question to wait so long, and then be told at last that Jupiter has changed the orbit and marred the calculation.

Sir Isaac Newton was a profound mathematician, a ripe scholar, and one of those good, Christian, benevolent characters, that were he to meet a stranger in the village streets, he would by no means view him with suspicion. He was one of that class that would pronounce him, if not a preacher, at least a schoolmaster. He was, furthermore, a remarkably fortunate man. It was his happy lot, on a certain occasion, to witness, with his philosophical eye, an apple fall to the ground. Yes, he observed that it did not fall upwards, but downwards. It struck him forcibly. That became the apple of Sir Isaac's eye. This remarkable physical phenomenon he named the attraction of gravitation; and, retiring to his studio, the little incident pointing the way, by the aid of conic sections, analytics, and other attractive and extractive powers, before referred to, as pertaining to astronomic science, he actually deciphered the weight and dimensions of the sun, the moon, and all the planets; their distances from each other, and from the central orb; that they all moved in ellipses, with perfect regularity and order, each keeping time, according to its size and distance from the sun; and that in reality there was such a thing as the music of the spheres. This, Reader, has conferred upon mankind a great benefit, especially as it enables us to calculate the longitude!

But he did not stop here. The workings of his great mind naturally led him to the consideration of Comets, and he devoted many hours to the meditation

of their abstruse and very eccentric natures. The result of his reflections, as well as his "immortal principia," have reached posterity, and as it would be ungracious in us to withhold, we present them to the reader :—"The vapors of Comets, being diluted, rarefied, and diffused, may probably, by means of their own gravity, be attracted down to the planets, and become intermingled with their atmospheres. For the conservation of the water and moisture of the planets, *Comets* seem absolutely requisite; from whose condensed vapors and exhalations, all that moisture, which is spent in vegetations and putrefactions and turned into dry earth, may be re-supplied and recruited; for all vegetables increase wholly from fluids, and turn by putrefaction into earth. Hence the quantity of dry earth must continually increase, and the moisture of the globe decrease, and at last be quite evaporated, if it have not a continual supply. And I suspect that the spirit which makes the finest, subtilest, and best part of our air, and which is absolutely requisite for the life and being of all things, comes principally from Comets."

From his view of the matter, it is evident that the erratic wanderer has eluded the grasp of even Sir Isaac himself; yet, notwithstanding, the promptings of his generous nature forces him to assign it the most benevolent character, as a Sister of Mercy. Endowed, he conceives, with high locomotion, and untrammeled by orbits, they bring to starved planets, more restricted in motion, the best of fresh water, and the sweetest pure air. But his benignity of temper closed his eye to the fact that these celestial conservators must often be disappointed, for water

thrown upon Saturn would be instantly frozen, whilst that ejected upon Mercury would flash into steam, and scald all the vegetables.

Although our wise men are unable to fix, with any kind of precision, the motions and characters of these stellar vagrants, yet they do furnish us with much information, not only interesting, but curious and useful. Comets, they tell us, generally appear with both a head and a tail, at times with a long one, and at other times short; and sometimes entirely destitute of the smallest caudal appendage. Again they have appeared with supernumerary tails—one having actually attained to the number of six, spread out like an immense fan; hence this kind are denominated "fan-tails." Others, small and numerous, are visible only through telescopes, and are called telescopic Comets, though microscopic might suit them better, as, from their description, they much resemble wriggling eels, as seen by microscopes in drops of vinegar.

Comets differ from planets in divers ways. They do not confine themselves to any particular region of the sky, but traverse indifferently every part, without any regard to the plane of our ecliptic. The courses they pursue "have been found to be of a parabolic form, or sensibly so."

They tell us, too: "By a remarkable coincidence, the orbit of Gambart's Comet very nearly intersects the orbit of the earth; so nearly, that if the two bodies should ever chance to arrive at the point of crossing at the same time, the earth would encounter a portion of the filmy mass of the Comet."

No Comet "has ever yet been observed to perform an entire circuit of the heavens."

"Their speed is astonishingly great, sometimes as high as 360 miles per second, and there is little reason to doubt that many of them recede *tens of thousands of millions* of miles from the sun before they begin to return to him again."

Whenever they have returned, however, they were found altered much in appearance, and upon each succeeding visit have grown dimmer and paler, until they have finally disappeared.

Planets, however, ever appear the same; never waning in their lights, and keeping the even tenor of their ways in regular courses around the central sun. About these the astronomer imparts full and satisfactory information, because he knows them well; but as to Comets, he can only speak mysteriously and uncertainly. Even the proud Solomon, in his proverbial philosophy, could confess that there were three, yea, four things, too wonderful for the grasp of his profound wisdom; and, following his illustrious example, our learned astronomer may well confess that the errant Comet is one thing that he "knows not," and that he cannot fathom it with the utmost of his powers.

CHAPTER II.

THE EARTH A COMET.

"Who's there? What light is that? Wherefore com'st thou?"
"To comfort you, and bring you joyful news."—MARLOW.

TRUTH is a rare jewel, often trodden under foot by those who are in pursuit of gems. Like Comets to the astronomer, it has often invited human hope to engage in its eager chase, and then taught, with its dissolving views, the fallacies of its vision. The academic groves of Greece re-echoed with notes of triumph at the capture of the Meteor; but all their learned disquisitions, their subtleties, and their sophistries, ended with the query: Where is the captive? What is truth? These failures have resulted, not from the natures of the objects sought, not of the Comet or truth, but in the manner of the seeking. The human mind, unimpressed with familiarity, has ever fondly conceived that the rich prize of hope must reside amidst the enchanting scenes of distance, and not in the simple and plain fields of home. Man fixed his gaze upon the heavens, and solved the riddle of stars and planets, before he gave a glance at the earth; and even whilst they had long taught him, by their motions and round faces, that his habitation was the same, yet he cherished the faith that it was a great stationary plane supported by a turtle. In the pursuit of truth, man has conducted his studies in a retrograde order. Astronomy, his first-born, is full-

grown, and gray—his last, agricultural science, is still in its infancy. The Pharisees of old were eagerly watching, in the dim distance, for the advent of their great kingdom; and whilst one, from observation, could discern its approach in this quarter, and another in that, the Author of Truth assured them that it need not be looked for at all, neither from here, nor from there, for it had already come, and was actually within them. Thus it is ever with all truths, both small and great; they are in us, and near us, above and below, all around and about us, and it needs no telescopic aids to find them.

Comet-ography is the latest and youngest of all the sciences. It disdains not the aid of the astronomer's lengthened tubes, it rejects not the facts of geological research, it denies not to Newton or Kepler the force of their laws, nor does it close eye or ear to the suggestions of any department of learning. It accepts assistance from every quarter, yet in all cases it insists upon reading their knotty problems by the undimmed rays of Divine light. Thus guided, this youthful science is already enabled to declare why the astronomer has so egregiously failed in his study of the nature of Comets. It affirms that he has looked in the great distance, through the wrong end of his telescope; that instead of gazing upon the flitting vagrant of the skies, he should have fixed his steady eye upon the earth itself. With the measure of knowledge already attained by him, had he consulted the Divine oracle he would there have found it most lucidly written that this *Earth is a Comet.* Comet-ography affirms that it was so made at the beginning, and that so it will continue, until the dark

shadow of time shall rest on the plains of eternity. Herself and her children loudly bespeak the ways of the vagrant. If we view her at birth, or mark her in death, or watch all her movements in her progress through life, we shall find her most inconstant and fitful, erratic and wayward, and withal committing such crotchetty freaks as are absolutely incompatible with the character of staid planets. The proverb affirms it, for this is stranger than fiction, and therefore is Truth. All the sciences, too, when read by Divine light, assure us that Scripture well explains all the changes she has passed through, as well as the bumps and the scars, and the odd things that are found in the folds of her body.

The great Founder of Christian science told us, not to read, but search the Scriptures. Yea, to scan them closely, as we would our father's will, or any written instrument in which we feel an interest; to read, mark, learn, and inwardly digest the words, if we would fathom the truth revealed. The importance of thorough mastication and digestion is furnished in the cases of Daniel and John, to each of whom little books were given to eat. They found them upon the tongue as sweet as honey, but upon digestion as bitter as gall; and they teach us that sound reflection and deep study not only serve to correct, but may absolutely reverse our first impressions.

Throughout the Scriptures we find that references are continually made to physical laws and physical things, as the well-known bases upon which other and more profound truths may be erected. It is presumed that we have already exercised the faculties with which we are endowed, and acquired a knowledge of

the things around us, and the laws which govern us and them. This species of knowledge, which we may procure for ourselves, is not within the scope of revelation, and it is presumed that we will obtain it, in order to comprehend revealed matters of a higher grade.

If this he has done, the Reader is already apprised that the sands and clays that constitute our soil are but the disintegrated particles of once solid rock, crumbled and changed by time; that he is aware that the solid crust of the globe abounds in cracks and fissures, that are filled, as if by a force from below, with other rocks, oftentimes charged with gold, silver, and the other metals; and that the large and massive rocks, as well as the smallest jewels, afford unmistakeable evidence that they have once been in a melted state, and by slowly cooling have assumed the crystalline form. And further, he has learned of those springs of boiling water, that from unfathomable depths never cease to flow; that he has heard the muffled rumbling of the earthquake low beneath his feet, and with terror felt its oscillating motion; and with wonder beheld the tall volcano, amidst perpetual snow, illuming the heavens with its glaring fires, and pouring out rivers of melted rock upon its verdant sides. Then the prying philosopher, too, has told him that, impelled by these and other evidences of internal fire and fluid, with thermometer in hand, he has sought the deepest pits and mining shafts of earth, and sounded the still deeper Artesian wells, and finds one constant law of regularly-increasing heat as he descends:—That for every 45 feet of depth, his little implement denotes one degree higher upon

its scale, and if this rate of increasing heat continues, the temperature of boiling water will be attained at a depth of two miles, and in twenty more miles the melting point of iron will be reached, with a heat sufficient to fuse almost every known substance. Then, too, he knows that this earth is round, a sphere, or nearly so, with its equatorial diameter 26 miles longer than its polar axis; and this shape, the mathematician tells him, if fused and melted, it would most certainly acquire by whirling rapidly upon its polar spindles. The shot tower tells the same. A cold pellet of lead, dropped from its summit, undergoes no change; but, melted and dropped again, in its fall through space it becomes an orb. This may be strange, yet it is the law of Nature, and Nature's God, whether shot or world be the subject of its powers. With proofs thus drawn from every source, by various means and in many ways, we are irresistibly forced to the conclusion that this planetary orb has once been wholly fused and in a melted state, and that but a thin crust of solid matter, produced by cooling, now separates us from an internal seething and boiling gulf. If so, you ask, When was this? Certainly, at the beginning, when it received all its parts, all its elements and its motions, from the hand of its Creator. Nothing since has been added to it, and nothing taken away. All that it originally received it still retains, and will retain until the end. The bodies of all living things upon its surface have been formed out of its dusty particles. Changes, great and radical, it has encountered, and will again encounter, until its final destiny is fulfilled.

"In the beginning God created the heaven and the

earth." Here the sacred writer makes a marked pause, as if to designate a first and independent stage, the duration of which he has not deemed worthy of mention: Original creation is the first stage.

The reader will conceive, in this brief description, our little earth hurled by the mighty hand of Omnipotence, or dropped from the workshop of the great Artificer of worlds, a glowing, reeking, incandescent mass, with a speed and power beyond our conception, whirling its way through the void immense. Its earths, its rocks, and all its metals, by the laws of gravity become a sphere, and form the head: whilst its rivers, lakes, and seas, are converted into steam—its atmosphere and gases charged with the heavier vapors of all its less volatile elements, and rarefied and expanded with the intense heat, follow as its train, itself candescent, yet illuminated by the glare of the head it follows, and we have revealed a Comet, in all the parts and proportions which the Astronomer has ever seen or described. Impelled in the beginning with a force she yet obeys, we may conceive her a bright star with a luminous tail streaming through the skies. In her rapid flight she regards no plane of the ecliptic—she makes no circuit in the heavens as the planets do. She totally disregards the ellipse her present round, but straight or parabolic lines she wilfully pursues. As yet no sun existed to tie her to her present course, no centre given, around which to revolve and re-revolve as now. No, not yet, but untied and unbound, she wildly roamed the boundless realms of space, measuring her flight by tens of thousands of millions of

miles. But as centuries and she roll on together, her first brilliancy alters, her glory grows dimmer; as she commingles her beams with the shades of eternity she becomes dull and faint, and finally is lost in the night of the void. Her crust has become cold and solid, her lustre is gone, and "darkness profound comes upon the face of the deep." This is the "beginning," and with what grand sublimity does the written word first reveal to man his God:

> "*Silence*, how dead! Darkness, how profound!
> "Nor eye, nor list'ning ear, an object finds.
> "Creation sleeps. 'Tis as the general pulse
> "Of life stood still, and nature made a pause,
> "An awful pause! prophetic of her end."

Well may the poet say, prophetic of her end. That chaotic orb, with the solemn quiet of the grave, suffused with the thick gloom of eternal night, was but the charnel house of all its future tenants. There lay entombed, the bodies of all her future offspring, awaiting the day of their resurrection. Death reigned supreme, the victory was with the grave. It seems to be an indwelling principle in the dust, the inorganic and inanimate, to long for the organic form; to surrender to every demand of vital power, and gladly contribute to the extension of life. The dead principle lies restless in its grave, ever anxious and eager to spring into being, and enjoy the pleasures of existence, even for a brief season. But the repose of the tomb was in that dark pile. The vital spark had not come to earth; the spirits in prison had not yet been visited. How like the Alpha to the Omega, "the beginning to the end."

But the spirit of God does come and moves upon

the face of the waters: And God said, Let there be light, and there was light. Thus, without sun, moon or star, at its Master's bidding, light comes forth, from the conglomerate mass, as one of its component parts. But what light can this be? Is it phosphoric? or a raging war of chemical affinities between the acids and the bases? or is it a galvanic and electric strife between the metals? or is it all combined with lurid lightning flashing over the scene? By dint of these disintegrating powers, the rocky crust of earth will be rapidly pulverized into soil and dust for future service. The light was divided from the darkness; and the evening and the morning were the first day. What day can the writer mean—what evening and morning? As yet there was no sun to divide the day from the night; none yet created for sign, or season, nor for such days and years as we have now. There was no solar beam to cast its shadow upon the dial's face, no sand for the hour-glass to keep a record of time. This we may safely believe was one of those days of the Lord, that numbers centuries of our time. With him, in his method of speaking of time, a day is as a thousand years, and a thousand years as one of our days. The Lord's doings, as well in this first revelation as in that which closes the history of this world's course, is told to us in days. The Spirit—as well to Moses as to John—speaks thus of time when the Lord is engaged either in making or unmaking worlds; and it is wholly consistent with the teaching of scripture, to understand that the stages of creation include lengthened periods of time.

As the *darkness* preceded the light in this first day

of creation, the evening is described as leading the morning.

The succeeding period, or second day of the creation, exhibits our Comet as still whirling through space, but undergoing such a rapid reduction of temperature, that the waters which have hitherto been rarefied by the extreme heat, and in the form of vapor, repelled into the remote regions of the firmament around and above it, are now condensing and falling in such copious showers as finally and effectually to cover its rotund form entirely over.

As periods succeed, so does development. The third day attests, that the Omnipotent voice commanded, that the waters should gather themselves together unto one place, and that the dry land should appear; and it was so. The impression conveyed in this sentence is undeniably that of unity: a single great continent, washed on either hand by a single great ocean, the waters of which, on the east and west sides, received the appellation of seas.

It is on this day, too, that organic life begins to manifest itself—that in the humblest form, the vegetable world first hears its Master's voice and comes. The lawns, the meadows and broad pastures of the sea become green with grasses; and the earth rejoiced in herb, and shrub and fruit trees yielding fruit, each bearing seed of its own kind within itself.

But at length the fourth day comes, and with it comes the Sun. Now our Comet is no longer free to roam through the wild wastes of eternity, a mystery in the skies. She no longer pursues either straight or parabolic lines, but, spell-bound, gracefully glides into an elliptic orbit, and makes her first entire cir-

cuit in the heavens. Chained as to a pivot, from that day to this our Comet, in one continual annual round, has paid allegiance to the imperial monarch of the skies; and, for doing so, the astronomer calls her a planet. But, as names cannot alter things, she is a Comet still.

Thus plainly must the reader see, that in Holy Writ our little orb is most intelligibly and unmistakably described as a wanderer in the skies, from her first creation up to the fourth period of her existence; she was then developing and maturing her varied powers, the better to sustain the teeming myriads soon to call her mother. Now, like a true and tender parent, mindful of the delicate natures of her progeny, she remains at home, dispensing blessings to all she bears.

Our Comet, on the fourth day, or period of her existence, has abandoned her former erratic course of life, and assumed a matronly position in the steady social system of the planetary world. Her first chief pleasure is devoted to the culture of fruits and flowers. Meadows and lawns are covered with shrubbery and grasses, orchards are laden with golden-tinted fruits; but all her roses are wasting their sweetness upon the desert air. Not even a minnow in the ocean, nor buzzing fly in the air, to break the dead silence that everywhere prevails. Such monotony is insufferable, and her kind Father, with the potency of his magic will, provides for all her wants. Every variety of fishes, from the tiny protozoa to the great whale, are soon found rejoicing in the depths and shallows of her broad ocean; and winged fowls of all sorts, from the gnat to the Dodo,

glide through the thin air, plucking fruits from her rich garden, or in robes of embroidery imbibing dewy nectar from her gay flowers. When these she has nurtured and learned well to take care of, others are sent her of different forms. These live on all-fours, save his majesty, man, who, as a sort of sub-angel, was more highly endowed.

The creatures first made all differed from those existing at present, and a glance at them, hereafter, will prove not only interesting but emphatically instructive. They have all changed, as their mother, the Comet, has changed; and so we shall find them hereafter, renewing their forms as she, as predestined, shall undergo other cometic mutations.

All creatures are best known by the peculiarities of their respective natures. Capricious inconstancy is the characteristic of Comets. That our earth belongs to this family is clearly evinced, not only from Scripture, but by the many whimsical freaks of her earliest infancy. When first issued from the workshop, she is found a glowing ball of fire, illuminating the heavens with an effulgent train. Tired with her splendor, she changes, and becomes an orb of solid stone, suffused with robes of "The blackness of darkness." Fitful, she again changes and arrays herself in vestments of joyous light. Restless still, again she changes, and becomes an universal ocean, without a shore. This, too, she soon changes, and presents one-third of herself above the water as "dry land," and clothes herself with verdure. To this another change ensues, that reclaims her from the wanton wilds, and binds her to a certain path. Such caprices can only indicate the Comet, and we should study

well and deeply her after-course in life, to learn what other freaks she may have committed. We may rest well assured, that although apparently reformed, she has at some time exhibited proofs of her innate temper, and that the dress of the Planet has not perpetually and effectually concealed this Comet's ears.

CHAPTER III.

THE ADAMLAND—ITS FORM, WINDS, AND RAIN.

For when you breathe, the air in order moves,
And when you speak, so well she dancing loves,
That doubling oft, and oft re-doubling new,
With thousand forms she doth herself endue;
For all the words that from your lips repair,
Are nought but tricks and turnings of the air.

JOHN DAVIES.

THE Mosaic history, thus clearly describing the Genesis of our Comet, with all things animate and inanimate upon it, happily for us does not stop here. Scepticism might deny and overthrow its simple and unsupported teachings, as with a powerful hand it has unsparingly assailed, and still assails, the statements it contains. The continuation of it, however, properly studied, overwhelmingly confirms its first developments; and the fabric of its details exhibits such a multitude of rare truths and facts, so nicely interwoven together, as to raise an impregnable fortress of

defiance and defence to and against all its strongest and bitterest foes.

It is not always an easy matter to recognize truth, when presented for our observation. Falsehood sometimes presents itself wearing the guise of truth; and truth may even come dressed in such a garb as to defy recognition. Experience has devised certain methods by which to inspect these varying phases, and to discriminate between them. Those who have devoted long lives to the investigations of such questions tell us, that evidence is of two kinds: the one positive and direct, and the other circumstantial, and the most reliable of the two. In the first, a single false and fabricated matter may be presented as a fact, without corroborating testimony to attest its verity, and hence the character of the witness is the sole measure of its worth; but in the last, consisting of many different incidents, each and every one of them must prove true, and be in harmony, as well with each other as with the main circumstance.

It is another rule of courts of law, that in construing a written document, each and every part of it shall be preserved intact, if possible; and as no writer can be presumed to intend to contradict himself, such a meaning shall be given to his words and statements as will preserve their entire consistency in every part, if this can be rationally done. These simple rules are the suggestions of long experience, and are sustained by common sense; and they are as valuable to us in our present efforts to reach the Sacred Author's meaning, and to test the actual merit of his statements, as they are in other cases of minor importance.

Especially so are they in regard to the antedeluvian history, which, covering in nine short chapters the long period of time from the creation to the flood, by its very brevity and hurried recital of events tends to produce confusion and misapprehension in the mind of the superficial reader. When read, however, as closely, and construed as fairly, as any other written document, and its contents are systematised and compared with each other, we are utterly astonished at the amount of valuable information imparted in the comprehensive book; and we are filled with admiration at the great net-work of circumstantial testimony with which it abounds, chiefly in the recital of a condition of things, existing in the primitive world, entirely unlike the present, yet in all their complicated features so woven together, and so allied with each other, as absolutely to preclude the least idea of deceit or imposture.

The perpendicular fall of the apple produced such a whirl in the contemplative brain of Sir Isaac Newton as led to the accurate knowledge of all sorts of forces and motions. Thereby were evolved certain physical laws, so steady and certain in all their operations, that they enjoy our faith as absolute verities. From them, it was most clearly deduced and established, that a rotary motion, aided by the powers of gravity, would produce in plastic material the form of a sphere. The earth, as it *now* stands, was so made, the philosopher affirms. But in this he most palpably errs; for, notwithstanding his lullaby suggestions of great globes and small grains of sand, the varied configuration and elevation of its continents, its multiform islands, the great chains of tall mountains,

running hither and thither, to every point of the compass, with the shattered and broken layers of the rocky crust of the globe, upturned on their edges, all join in proclaiming that they have not resulted from uniform powers or regular forces. This conclusion is one of the fallacies of science; an instance of self-delusion, wherein overweening desire has blinded the eye, and accepted unnatural effects, from natural causes. The confused irregularities of our present earth cannot be attributed to any regular and uniform influences; and the philosopher who asserts it resembles

> "The flattering painter, who made it his care,
> To paint men as they ought to be, and not as they are."

The earth, when first made, strictly conformed in all its features to this steady, certain, and unerring law of forces. It required no apologetic explanations to account for its anomalous irregularities, for its shape was that of a true sphere, precisely agreeing with the just demands of the soundest philosophy. The mathematician, then, as well as the astronomer, might have found, in the plain page of Scripture, a solution of his difficulties, with a most beautiful and forcible illustration of the deductions of his exact science.

The Sacred Historian informs us that the "dry land," or primitive world, was unlike the present; and that, in fact, it was one great plain, so to speak in ordinary language, unencumbered by tall mountains or other great irregularities of its surface. Its elevations are furnished to us, not by the engineer's level,

or by any less certain measurement of the barometer, but in the most sure and precise manner that is known. The water level, as given by him, presents the true altitude of its mountains above the surface of the sea, without the possibility of error: "Fifteen cubits upwards did the waters prevail; and the mountains were covered," is the laconic, but very comprehensive method adopted by him to convey to us an adequate idea of the physical geography of the earth prior to the flood. That the writer well understood the force and meaning of the language he has used, and its full import, his history fully discloses in all its pages. The precise form and dimensions of this world of antiquity he has not, in express terms, given us; yet indirectly he has furnished the data by which, if we choose, we may ascertain its true size and limits, and even mark out its map, depicted with parallels, meridians, and zones. We accept, then, at present, a single large continent, with a surface gently rolling, exceeding in size all our continents and islands. That it had rivers upon it we are expressly informed, and we may safely superadd, as the natural accompaniments of all flat countries, lakes, ponds, meadows, marshes, and branches, with shores gradually shelving beneath the ocean adjoining.

The world thus described presents a *direct contrast* to the present. That was a unit; this is divided into many continents, peninsulas, and islands. That was a great and uniform plain; this is diversified with mountains, hills and valleys, with no two portions of the same elevation. Such a contrast is striking and strong, yet it is wholly deduced from the pages of scripture.

The Winds.—If the ancient world were constituted as we have described it, then in all respects should we find its physical features tallying with it, and differing essentially from those surrounding ourselves. The two worlds, standing in antithesis to each other, should certainly present aspects of opposite characters; and the inquiry arises, has the writer furnished other statements in regard to the primitive world? and if so, do they maintain a proper relation to the several parts? Upon examination, we shall find, that he has not been at all oblivious, but in his brief way has presented us with a vivid picture of the olden times, extremely curious and interesting, yet directly the opposite of the present.

He has not told us in express terms how the winds blew, neither that an apple would fall to the ground. A matter so simple, in such a world, needed no special reference. The man of science, a Maury or a Guyot, can, from the description already given, prepare a map of the winds of the Adamland, with more accuracy and fidelity than of the earth they live upon. Nothing was there to oppose them in their wonted ways, and nothing to change them in their circuits. Those parties in their works have, in fact, already described how the ærial currents would flow in a world like that before the flood.

When the proverb charges the wind with fickleness it slanders the air, and attributes to it the fault which others should bear. Of all things created, none is more obedient to law, none more disposed to regularity of motion, than the atmospheric air. Ever vigilant and ready to obey all demands, its very celerity is blamed and made the subject of calumny.

In addition to promptitude, it responds to all calls, with mathematical precision, neither falling short, nor exceeding, the measure demanded. Its traits are well known ; and the orator commands its vibrations and reaches the heart of his hearer with his nicely modified tones : the chorister, with quavers and trill, fully relies on its subserviency to will: the deep-toned organ, the gentle lute, the shrill fife, as well as the instrument with strings, attest the extreme complaisance of its nature ; whilst its impartial compliance with all demands is equally manifested in the thunders of heaven, and in the first feeble cheeping of the tender nestling. Sound, then, the winds' able advocate, repels the charge of fickleness, and well establishes that they, as true and willing subjects, are ever obedient to fixed law.

Undisturbed by local causes, the winds would pursue one steady and continuous route. On the 30th degrees of latitude, north and south, we find two belts of constant calms encircling the earth, called by sailors "the horse latitudes," but scientifically termed the calm belts of Cancer and Capricorn. On the equator is another belt, known as the equatorial calm belt. On our ancient world, we should find, as now, the winds as surface currents, blowing from these tropical calm belts towards the equator and forming on the one side a north-easterly, and on the other a south-easterly wind. Meeting from opposite directions, they would ascend in the equatorial calm belt, to a height corresponding to their heat ; then divide, and as upper currents reversing their former direction, flow back again to their respective calm belts. Here they would meet other winds from the poles,

and mingling with them, would descend and again divide; one half, as before, flowing towards the equator, and the other, as a south-west in the northern hemisphere, and as a north-west wind in the southern, make their way to the poles. These courses would they preserve and maintain, with mathematical precision, as they would encounter no obstacles or causes to divert or restrain them. Obedient to law, uniformity of surface would induce uniform motion, and they would exhibit the same regularity and order in pursuing their circuits, as is found in the undisturbed ways of the planetary system. This feature in the winds presents us with another contrast between the ancient world and ours.

Rain.—Although our author does not *expressly* inform us how the winds blew, yet he does, in his comprehensive method, impart to us that knowledge with precision, when communicating another remarkable and inseparably connected phenomenon, pertaining to the Adamland. This great continent, he informs us, was not dependent upon rains for its moisture, but upon "mists that went up from the earth, and watered the whole face of the ground." It was a rainless country, yet abundantly nourished, throughout its whole surface, by the genial influences of mists, fogs and dews.

A proposition so novel may prove startling and incredible to many, and especially to those who conceive that the order of things immediately surrounding themselves must prevail throughout universal space; and even the man of some scientific attainment may, at first blush, feel sceptical as to the possibility of a world existing without rain. Yet it will re-

quire but little reflection on the part of the one, and but little additional information on the part of the other, to secure universal assent to the simplicity and certainty of the truth thus revealed by the sacred writer.

The Greeks fabled the existence of Æolus, a god to whose whimsical temper was entrusted the charge of the winds. We know, however, that these, as all other physical things, are obedient to nature's laws, and that each portion of the earth has its Æolus to direct them in their ways. The mountains are the storm kings of earth, and regulate the temper of winds and the measure of its rains; and it is to the conflicts between these contending monarchs, that all our atmospheric changes are due.

The air has been aptly termed the great mediator between the land and the sea, and between the different parts of the earth's surface. Does the earth become too hot, the winds rush from the sea to cool it; does the heat oppress the sea, the mediator hastens to its relief. No sooner does one part of the earth become surcharged with heat, than the winged messenger comes to take off its surplus, and bear it to another, standing in need of its comfort. The labor of the winds is engaged in equalizing the temperature of the earth's surface, and maintaining an equilibrium between its own parts. Were there no mountains, its natural impulse would lead it to follow the sun, between the tropics, in its course from east to west, and gather the heat as fast as generated, and transport and diffuse it over the extra-tropical regions even to the poles. Its tendency is first to seek the heated regions and get warmed, and then fly to the colder zones to cool itself. This it essays to do now,

between our calm belts, as attested by the regular trade winds, but its purposes are frustrated by ever recurring mountains. The rains tell what causes the aberration of the winds, from their most natural course from the equator to the poles; and, if we ask of them, they point to the mountains.

The air, as well as water, is endowed with most wonderful and remarkable properties. Heat it and it becomes lighter, and ascends exactly to that height where the density of the air is equal to its own. It will go no higher than its measure of heat will carry it; and, if it is forced to cross high mountains, it must first attain the requisite degree of heat to enable it to do so. If a high mountain stands in its path, it must linger upon the earth's surface until it becomes hot enough to overcome the ascent before it.

The air also possesses the capacity of dissolving water, as water does salt or sugar; and, in exact proportion with its heat, does this capacity increase until it is saturated, or as full as it can hold. Reversing this order, as its temperature is lowered, so by regular measure does it squeeze out its water, until it becomes perfectly dry.

As we ascend above the surface of the earth, the atmosphere, by a steady gradation of one degree for every 350 feet of elevation, becomes colder, and at certain elevations reaches the regions of perpetual snow. This snow line at the equator is highest, being there fixed at 15,207 feet above the level of the sea, yet descends progressively towards the poles, being 3,818 feet in latitude 60, and 1,016 feet in latitude 75, and reaches the earth's surface about the 80th parallel.

Mountains exist in every continent, differing both in latitude and in height; and, therefore, exert different chilling powers upon the winds, and take from them more or less moisture, according to their elevation and position.

Our rains all come from the ocean, and the winds bring them to us. When they reach the land with their treasures, which they wish to distribute evenly, as mists and dews, over the face of the whole earth, they are robbed by the mountains, and forced to give up to waste, what was destined for general diffusion. Some portions receive but little, others more than they need; some are drenched to excess, whilst others suffer with want. Instead of regularity and order in the course of the winds and the distribution of rains, the whole atmospheric phenomena are involved in utter confusion. That this is all due to mountain chains and plateaus, the science of meteorology discloses, and, by way of illustration, we cite a few facts:

The great trade winds that sweep the Pacific ocean, no sooner reach the land than they are confronted by the elevated Lupata chain of mountains, that skirt the eastern coast of Africa. Forced to ascend, they reach an elevation which chills and condenses the vapors they have gathered, and their store is exhausted. After crossing the mountains, dry and cold, they are more disposed to demand than to give moisture; and the sandy deserts in their train affirm that the coast has selfishly enjoyed what was necessary and destined for the entire continent. Winging their way across the Atlantic, they reach the shores of South America with superabundant supplies. The

humble mountains in the East offer but little obstruction to their passage, and moderate rains are given for the liberty. Yet loaded, they cross the broad pampas on their way to the Pacific, and when nearly in sight of the ocean, find the snow-capped Andes across their path, to whose chilled heights they are compelled to surrender all their treasures. Innumerable rivers, oftentimes excessively flooded, irrigate the continent, east of the Cordilleras; whilst Peru, just beyond, with the broad main in view, gets not a drop. The atmosphere of South America is so thoroughly saturated with moisture, that, without rain at all, her vegetable world feels no thirst, but with broadly expanded leaves takes its drink directly from the air. Were the Andes, however, upon the eastern, instead of the western coast, then indeed we should find her all Peru, or the counterpart of Africa.

In North America, the great rivers—the Mississippi, Missouri, St. Lawrence, and others—are indebted to the lofty summits of the Rocky Mountains, for wringing from the winds the waters they bear; and their constant volumes attest the immense amount of fluid thus transported from the sea, entirely across the continent, to the very verge of the land. In Oregon, the southwest winds prevail throughout the year, and their vapors are condensed upon the mountain sides. Its rains are monthly; but for three months they fall continuously, and in that time measure a depth of thirty inches.

In winter and spring, the south-west winds come to California, loaded with the vapors of the Pacific, and the mountains convert them into rain. This is the wet season, west of the chain, but the dry on the

east; when the winds change, and reverse their course, with the march of the sun, then the wet season is on the east, and the dry on the west of the mountains. Lower California, Mexico, Peru and part of Chili, lie within the range of the easterly trades, that part with their moisture, to intervening elevations, before reaching them, and as they receive no aid from the Pacific, they form the "rainless countries of America."

Southern Asia is within the tropics, and experiences within the year a regular change in the winds and in her seasons. From October to April the north-east trades prevail, and blow across the Peninsula of Hindostan, until they reach the long and elevated chains of mountains that skirt the Malabar coast, known as the Western Ghauts. Upon their slopes, they are chilled, and the vapors condensed in copious rains which are confined to the table lands east of the chain, for west of it, during this season, it is as dry as Peru. From April to October the south-west monsoon prevails, and brings the vapors from the Indian ocean directly upon the western sides of the Ghauts. This side now, with the plain below, is overwhelmed with torrents of rain, whilst the east enjoys its dry season. The quantity of rain that falls here is enormously great, being, south of Bombay, at an elevation of 4,200 feet, as much as 302 inches, or 25 feet, during the season. The winds of the Pacific, whether full or empty, on their course to the poles, are confronted by the Himalaya, who takes the last atom to make snow on his summit; and the great desert of Gobi, beyond, with the thirsty regions around, like Tantalus of old, constantly view with feverish de-

sire the refreshing magazine, but without the ability to partake the first particle.

The south-west winds blowing from the Mediterranean are checked in their progress by the humble Appenines, 5,000 feet in height, and their vapors are condensed into rain. The portion that falls upon the windward side measures during the year 64 inches in depth, whilst that upon the leeward amounts to but 26 inches. The same difference is manifested between the two slopes of the Alps on the north of Italy: whilst on the south from 60 to 90 inches of rain annually falls, only 35 inches are received in the same time by the lands on the north.

On the coast of Norway the heated vapors of the Gulf are constantly precipitated in fogs, and the frozen mountain chains condense in rain 82 inches per annum, an enormous amount for so high a latitude. Sweden, on the east of the Dofrafield chain, receives from the very same winds cold but clear weather, with annual rain to the amount of 21 inches.

In England, the mountainous districts receive more than twice the amount of rain that those do of less elevation. In Essex the annual average is 19 inches, in Cumberland it reaches 69½. At Kinfauns, in Scotland, five years' observation has established as its annual average 25½ inches, whilst upon a neighboring hill of 600 feet elevation the amount received measured 41½ inches per year.

Elevated plains present on their slopes and borders the same condensing powers as the mountain chains, only in a less degree. The south-west winds of the Atlantic, impinging upon the plateaus of moderate elevation in Spain and Portugal, distill about 26 inches

of rain per year upon the coasts, whilst the elevated table lands of La Mancha and Castile, in the centre of which stands Madrid, receive but 10 inches as an annual average. Similar features are presented by the plateaus in all the continents where similarity of cause exists.

The extensive and sandy deserts of Persia and Arabia are regions lying to the leeward sides of mountains that effectually intercept the moisture of the prevailing winds. The windward mountain-side receives that which should be theirs.

Egypt, flanked by mountains on both sides, is a rainless country, yet not a desert, but a proverb for fertility. It is commonly said that an annual inundation of the Nile procures for it the rich agricultural stores it enjoys. This is, however, an error, and every farmer knows that a wetting of the soil once in the year is wholly inadequate to supply it with moisture for the maturity of any crop. Irrigation is used extensively, but only for particular plants. The dews secure for Egypt its richest blessings. The winds for several months in the year, laden with the vapors of the Mediterranean Sea, blow intermittingly up the valley. In the day the sky is bright, without a cloud; but at night the surface of the earth is cooled, and abundant dews are deposited, followed by a hazy mist in the morning. The Nile replenishes the soil with the elements of fertility in the form of saline earths; but the atmosphere provides the moisture for most of the plants cultivated in Egypt.* From the few cases

* For further information upon these and kindred subjects, the reader is recommended to Prof. Maury's "Physical Geography of the Sea," and Prof. Guyot's "Earth and Man, or Physical Geography of the Earth," both small and interesting works.

thus briefly cited and imperfectly illustrated, it is sufficiently apparent that the mountains are the rain-kings of earth, and that their condensing powers are in exact proportion to their respective heights. A slight consideration is only necessary to insure the further conclusion, that their effects are not confined to their own immediate vicinity, but are felt at points extremely remote from themselves. The atmosphere is a fluid ocean, of such extreme sensibility, that, its least part disturbed, excites universal sympathy throughout its extended bounds. Were it reduced to deathlike stillness everywhere, a fire kindled in one spot would put the whole in motion. A typhoon in the east may find its response in the tornado of the west; and the hurricane of the Atlantic is but the echo to the cyclone of the Indian Ocean.

The general tendency of the warm and moist winds of the tropics is to seek the polar regions to cool; but in both hemispheres, in the heights of the mountains, they are as effectually deprived of their elements as they would be by a visit to the arctic or antarctic ices. They have found the frigid zones in their path, and thereby had their first tendency destroyed. Thus their natures become changed, and they desire to return to the heated and moist surface to replenish their stores. Cold and dense, they turn back and descend to the earth; and, having been robbed, they too become robbers, and plunder other winds they may meet in their course. To these, for the heat and moisture they abstract, they impart the icy coldness received from the mountains, and alter their natures as much as a visit to the poles would accomplish. These last, in their turn, become robbers, and fall

upon other currents of air; and conflict after conflict ensues throughout all the realms of the winds. Instead of visiting the frozen zones, they find everywhere the cold of the poles seeking for them, and, by their overpowering influences, thwarting their purposes and destroying all order and discipline. These changes are not confined to the tropics, but prevail universally over the lands and seas, and the derangement begins with the winds that are brought in contact with the mountains. Instead of visiting the poles in a regular and orderly way, they meet their cold natures traveling upon the wings of the wind; and, although no mountains or ices are near, they are forced to surrender their moisture and heat to their subordinate couriers speeding in all directions. Hence the winds are termed variable, and rains are found falling promiscuously and irregularly, seemingly without any attention to method. As we witness the strong races of the earth, the great birds of the air, and the more powerful fishes of the sea, all preying upon their weaker fellows, so even do we find the currents of the air engaged in robbing their weaker fellows of their treasures; and thus the conflicts and confusion between the tenants of the land and the sea are found to exist even in the airy elements that surround us. So universal is the disorder of Babel.

Were it not for these rain-kings all would be harmony and order, without the perplexity and complication that now rules in all the realms of nature. No rain could fall, for even now in both Americas, and in spite of the humble mountains of the east, we find the winds actually bearing the greatest portion of their moisture entirely across the continent, and then, in

view of the Pacific, surrendering it to the high and chilling barriers that oppose their further progress. But for them they would continue their course undisturbed, still laden with their wealth.

In the Adamland there were no mountains to obstruct the winds in their paths, no Siberian plateaus, nor elevated crests in the regions of perpetual ground frost, to keep the polar winds at an icy temperature until they should meet and mingle with the warm air of the tropics. Here the slightest heat at the equator causes the air to rise, other air comes in to fill its place, and air follows air from the very poles. As the polar air starts from the equator, the warm air of the equator turns towards the poles, and an endless web is formed, rolling around the extremities; when one part moves, the whole would surely follow. Two contrary currents, one below and the other above, keep up an untiring circuit, the polar air to warm, the torrid to get cool. As they find no elevations to obstruct them, it is unnecessary to detain and bake them hot enough to enable them to ascend to the frozen summits of Chimborazo, Himalaya, Atlas, or the Alps. A moderate elevation, sufficient to admit the passage of the undercurrent, is all that is required to insure a full and perfect circulation; and the slightest elevation of temperature incites a universal movement. Hence we may know that the Adamland was neither oppressed with excessive heat or excessive cold, but enjoyed a gradual transition from an equatorial summer to an arctic winter.

The difference between mist and rain is very slight. If the moisture in the air be condensed near the surface, dews, mists or fogs are formed; but if high

above, the vapor at first assumes the form of mists, and the little particle of water, like a snow-ball rolled upon the snow, gathers to itself more particles in its fall, and makes a drop at last. In the more northern latitudes rain is never seen, as the particles are condensed too near the surface to attain by accumulation the rain-drop size, and hence only fogs and mists are known. In the temperate portions of the earth they become larger, but are still moderate in their dimensions; whilst under the equator they acquire the magnitude of marbles, and are even an inch in diameter. The size of the drop is wholly dependent upon the altitude from which the first small particles begin to fall; and if the currents of air were not forced to great heights, there to meet with chilling influences, rain could not exist.

In regard to our earth, as at present constituted, subject to all its complications and disturbances, the learned geographer of Edinburgh, in his Physical Atlas, states: "The immense tracts, marked '*Rainless* districts' on the map, extend on both sides of the equator, near the tropics. They form a belt around the globe, interrupted only by mountain ranges. In some of these districts a drop of rain is never known to fall, and in others it is known only at long intervals and in very small quantities." So, too, says Prof. Maury, in his Physical Geography of the Sea, § 781: "We know from observation that the trade-wind regions of the ocean, beyond the immediate vicinity of the land, are for the most part rainless regions, and that the trade-wind zones may be described in a hyetographic sense as the evaporating regions."

Within the tropics, then, we may feel assured that

the Adamland was truly and in fact a "rainless country," dependent upon mists and dews for moisture. How was it in its extra tropical portions?

The calm belts of Cancer and Capricorn divide the torrid from the temperate regions. They stand continuously upon the 30th parallels of latitude; and, although the learned Halley confessed that he "could not conceive why the limits of the trade-winds should be fixed on this parallel all around the globe," yet the winds in their infancy discovered that here was the proper meeting-ground for the polar and equatorial currents. As much air must go to as comes from these extremities; and whilst one half is going to the north, the other half should be moving to the south, to make the adjustment perfect. Those parallels equally divide the hemispheres. From the equator to the 30th parallel the earth's *surface* is precisely equal to the portion between that parallel and the pole; and the winds, with mathematical accuracy, conform to this line as their natural boundary and meeting ground.

The trade winds upon the Adamland, having discharged their functions within the tropics, would ascend at the equator, and as upper currents fly to the calm belts. Here they would descend, and as under currents continue their flight to the poles. Throughout their whole course they would meet with no disturbing or chilling influences, but at every foot of the way would find the earth's surface growing gradually cooler, and their temperature would be as uniformly reduced. They would, therefore, part with their moisture in an imperceptible, yet even and regular manner; and not being very elevated, and

meeting no polar messengers in their way suddenly to condense them, the possibility of rain would be absolutely precluded. Mists, fogs and dews would be the character of the watery precipitations in its extra-tropical regions. As the regular trades should come, laden with the vapors of the ocean, they would find, during the day, the earth's surface hotter than themselves, and unable to extract its moisture; but the shades of night would, by radiation, cool the surface, and cover it over with copious dews. The morning sun would dissolve the buoyant fogs, first near the earth, and higher by degrees, and thus present the appearance of "mists going up from the earth, and still watering the whole face of the ground." So, too, in the temperate regions, the same winds, yet unexhausted, would, in nightly dews and morning fogs, dispense their blessings with an even hand. And by this simple, yet beautiful and orderly system, was the whole and every portion of the Adamland regularly and uniformly irrigated, every square foot of surface receiving each day an adequate supply for that day's wants. No Lupata chain was there, selfishly to appropriate Sahara's rights; no Himalaya to plunder a Gobi of its dues. One inexorable region did not intercept three hundred inches of rain, leaving to another the stinted allowance of ten; neither did excessive floods arise in one part, to destroy crops and wash away the soil, whilst parching drought visited others with perpetual sterility. Even-handed justice prevailed in Adamland, and every portion alike enjoyed the inestimable gifts of bounteous Nature.

Though the ancient continent was a rainless country, there was a portion of it upon which it probably

rained incessantly. Upon our equator is a narrow belt of calms, entirely surrounding the globe. It is here the winds from the north and south meet and face each other, unable to proceed any farther. Being heated they ascend, and the portion nearest the north pole turns to the arctic, and that next to the south turns to the antarctic regions, and thither they mutually fly. The middle portion, however, like Addison's ass between two bundles of hay, is equally attracted both by the north and the south, and can turn to neither. Its flight, therefore, is directly upwards, and it continues to ascend until it reaches the cold regions, from whence its vapors constantly fall in perpetual showers. Over this belt, a continuous cloud encircles the earth, known as "The Equatorial Cloud Ring." This calm and cloud ring encompassed the Adamland, and kept the earth's surface beneath it marshy and sloppy, thus rendering it unsuitable as a residence for man, but forming a paradise for the gigantic cayman and crocodile, plesiosaurus and company, whose amphibious natures delight in paludal homes.

Some may feel disposed to doubt the sufficiency of the mists and dews, thus furnished, to sustain the departments of organic life. But they should remember, that the heat of the sun was as great then as now, and that the properties of the air, earth and water, remain unchanged; that the absorbing powers of the atmosphere would uplift the vapors, and the winds transport them to the land where they would be condensed by the cooling of its surface. The manner, the form only, would be altered; raindrops giving place to misty particles. If each day

should only receive a single line, or the twelfth part of an inch, in the form of dew or mist, this, in the course of the year, would secure to every portion an amount of moisture equal to 30 inches of rain; a greater quantity than is now really *enjoyed* by our extra tropical regions, and thrice as much as the capital of Spain receives. The temperate regions at present obtain as their average: Europe, 34 inches; America, 39; Australia, 26. Within the tropics, the annual average is 95 inches. And the larger portion of this water, especially in the torrid zone, is greatly in excess of what is actually needed and enjoyed, for it hurries rapidly into creeks and rivers, swells their volume and soon again mingles with the ocean.

The globe, as it now exists, presents three parts of ocean and one part of land, and the quantity of rain that annually falls upon its surface is estimated to be sufficient to cover it entirely over to the depth of five feet, nearly. The ancient world consisted of two-thirds ocean, as the surface of evaporation, with one-third land, and consequently the moisture imbibed from the ocean, by the air, would be equivalent to a depth of four and a half feet; and, as the quantity deposited upon the earth's surface would not fall in torrents for destruction, nor run idly to waste, it would assuredly prove fully sufficient for all the demands of nature.

The physical system of the antediluvian world, as thus described by the sacred historian, can but fill the contemplative mind with admiration and delight. The simple, but beautiful adaptation of earth, sea, air, heat and light, to accomplish all their ends, in perfect harmony with each other, without a jar or jostle

to mar the all-pervading unity, bespeaks Almighty wisdom. Throughout the realms of nature, concord and amity prevailed, and all the elements co-operated, with fraternal feelings, to secure the greatest enjoyment and perfection for created beings. The vegetable world was unacquainted with hunger and thirst, and rejoiced in continuous supplies of food and drink, brought by the untiring pinions of the friendly winds. No cloud was there to intercept the solar beam, no sudden transitions of heat and cold to check its progress to maturity. The beasts and birds revelled in a paradise of constant felicity, and man himself was exempt from all uncertainty and perplexity arising from vicissitudes in climate.

Even the *idea* of such a world, so harmoniously and nicely adjusted in all its parts, could only have originated with the *Author of Unity*, the *Mind Omniscient*. Finite man could never have conceived it, so striking is the contrast between that ancient land and ours.

POSTSCRIPTUM.

In the foregoing discussion of the ærial currents, we have conformed to the views prevailing in the philosophic world. It will not, however, escape the observant mind, that the theory is not fully adequate to account for all the facts; and as the latter have been, by repeated observations, well ascertained, the deficiency must be sought for in the former.

If, as is generally held, the air, when cold, is heavier

in all cases than when warm, it is certainly remarkable that, within the tropics, snow should permanently abide upon the mountain tops, whilst the earth's surface below should as constantly maintain the high temperature of 84 degrees; and, equally remarkable is it, that the warm air from the calm belts of Cancer and Capricorn should seek the polar regions as surface currents, whilst the frozen and heavier air from the poles should flow in the regions above it, on its way to the equator. Such facts are absolutely incompatible with the theory, and the error must lie in a misapprehension of the true character of the atmosphere.

Air and water are very much alike in all their known properties, and the end and design of both is the same—to contribute to the comfort, and preserve the lives and health of the organized beings of the earth, the air, and the water. They are both fluids, governed by like laws, and affected alike by the same influences. Heat applied to their surfaces but slightly changes their temperature, and scarcely excites a movement; yet, applied below, soon induces a general circulation and heats the whole throughout. Air dissolves water, as also does water dissolve the air, and the winged fowl swim through the one, as the fishes do in the other. The atmosphere, correctly viewed, is but a great ocean, in which is immersed the earth and all its members. From the close resemblance existing between the two, we should reasonably expect to learn that the law that is found to rule the water also prevails in the air that surrounds us.

It was formerly held that the density of water regularly increased as its temperature was reduced,

without any exception; yet the discovery of another trait, previously unknown, discloses that this law is true only to a certain extent. Above the 40th (truly 39° 38') degree of Fahrenheit, as it cools upon the surface, it becomes more dense and sinks to the bottom, forcing the warmer water above it. But below 40° its character is reversed entirely; and, as it grows more and more cold, it becomes lighter and rises to the surface. By this singular and most wonderful property imparted to water by an All-Wise Creator, the surfaces of ponds, lakes, rivers and oceans, are first frozen, and a shield of ice thus thrown over them, to stay their further congelation. But for this benignant change in the density of water, as it approaches the freezing point, ice would commence forming below, and increase in thickness upwards, until the whole would congeal into a solid mass impenetrable to heat from its surface. This property has been ascertained from experiments made in the laboratory, and, knowing this, we require none to assure us that the air must necessarily possess a similar property; though the precise degree or point of change must differ. Were the atmosphere not so endowed, the earth would be entirely destitute of life, for nothing could live upon it. The air from the Arctic and Antarctic regions, with a temperature of 60° below zero, if correspondingly dense and heavy, should flow over the surface in one incessant stream to the equator, and that from the snow line above us, like lead, should fall to the ground and keep it in a perpetually frozen state. That such, happily, is not the case, is sufficient to teach us that the Almighty mind has most kindly and considerately imparted to

the air a similar attribute to that exhibited by the denser fluid.

Upon the equator, the line of perpetual snow is found at the height of about three miles above the level of the ocean. As we proceed from the equator towards the poles, this snow line gradually becomes lower, and at the 80th parallel of latitude it reaches the ground. The earth is thus completely enclosed within a globe, or more truly an ellipse of frozen air, which everywhere surrounds it. It is generally held, that as the temperature and density progressively change as the height increases from the surface of the earth to the snow-line, so must it continue to alter above and outside of that line, until at the height of fifty miles its tenuity must be inappreciable. This opinion, we apprehend, founded upon conjecture, is erroneous and needs correction; but as we cannot well inspect the state of the air in its higher zones, a resort must be had to reason and analogy.

Professor Maury, in the addenda to his work, relates that Commodore Rogers, while cruising in the North Pacific, made *many* observations as to the waters within Behring's Straits, and invariably found three different strata: the first, "warm and light water at the top;" the second, of "cold water in the middle;" and the third, a stratum of hot and heavy water at the bottom of the sea; and this stratification, he thinks, may hold good throughout the ocean, where the differing temperatures demand it. Within the polar basin these layers would only be the more distinctly marked, and the more easily discernible.

A similar stratification, no doubt, exists in the atmosphere, as we may conclude from its resemblance

in other respects to the ocean; thus, consisting of a warm and heavy stratum below, a cold one in the middle, and a hot and light above. For the support of such an opinion, a few facts will only now be adduced. The Open Polar Sea, being new and unexplored, is certainly a most remarkable phenomenon in physical nature. Dr. Kane, enveloped in solid ices at Rensellaer Bay, affirms that but a short distance northwards, in latitude 82°, was found an immense basin of water, whose shores consisted of thawing and fragile snows and ices, and these were backed by mountains of frozen glaciers. In the expanded sea itself, the tides and currents were equally as manifest as in the open Atlantic, and that the feathered tribes, in prodigious numbers, were enjoying themselves in its genial comforts. To account for the existence of such an ocean, in such an inhospitable region, the warm waters of the Gulf Stream are pointed to, as all-sufficient for the purpose. Yet this position is not only unsatisfactory but untenable. Before the Gulf waters can reach the polar basin, they must actually pass by and beneath the ices in lower latitudes, and withhold all their calorific powers for the final conflict. Besides, being inadequate as to quantity, that peculiar property which water possesses would render these warmer waters too heavy to reach the surface; the colder waters which, by theory, should be found in so high a latitude, would clearly be entitled to the highest place, and thus be kept perpetually congealed. The open water can only be ascribed to the heated temperature of the atmosphere, that constantly reposes upon its surface; and hence we must conclude, that the outer and

upper edge of the frozen zone of air, that surrounds the globe and overhangs our heads, must terminate in latitude 82°, upon the shores of the Polar Sea.

If the parallel of 80°, the ground snow-line as commonly stated, be taken as the inner boundary of this frozen zone, and the latitude of 82° as its outer or upper limit, the difference between the versed sines of these degrees gives 22 miles as its thickness in the arctic regions, measured upon the axis of the earth. As the equatorial diameter of the earth is six times as great as that of the circle of these polar latitudes, this frozen zone must gradually thin out as it approaches the equator, and can there not exceed $3\frac{2}{3}$ miles in depth. Outside and above this cold stratum must exist the great ocean of heated air, into which the equatorial calm belt, like a huge river, is constantly emptying the gathered wastes of earth. Here is the great reservoir of heat to maintain the equilibrium of the globe. Do forests die or prairies burn, do war, pestilence and famine desolate the earth, the enormous amount of heat thus set free and surrendered back into the common stock, is transferred to the great storehouse, to be returned again, as increasing vitality shall demand it. The calm belts of the equator and the poles are the flues of escape, and those of the tropics are the channels through which restoration is made.

That there is such a reservoir a little reflection teaches. The earth in its inception was a liquid fiery ball. In cooling down, the amount of heat liberated was immense, and its volume far too great to be contained within the circumscribed limits of our

frozen zone. True, much of it exists in the bodies of living things, in the fields of fossil coal, and matter generally; but if all the heat contained in the bodies of the animated races were superadded to that of the vegetable world, the whole would be insufficient to evaporate the ocean, much less to melt the earthy and rocky crust of the globe. As heat is matter, and indestructible, the amount thus liberated can only exist above the outer limits of the elliptical snow-line. On the parallels of 30° the barometer discloses that the pressure of the atmosphere is the greatest, and its temperature uniformly 70°, or nearly so; on either side of this parallel the pressure diminishes as well towards the equator as towards the poles, and from it the winds blow in opposite directions. The temperature teaches that the glowing air above has mingled with the cold air of the frozen zone in its descent to the surface of the earth.

Whence come our hail-stones? it may pertinently be asked in this connection. The pellets are seldom or never round, as rain-drops or shot become, by falling through the air, but angular and elongated. Their size, much larger than the rain-drop, and the greater force with which they fall, both indicate an origin far above our ordinary clouds. The hail-stone is not as heavy as a drop of water of the same size, yet the latter are never charged with breaking glass or killing cattle. One being solid and the other liquid can make no difference as to the degree of force with which they strike the earth, for that is determined by their weight and the height from which they fall. Hail-stones, it is evident, from their angular form, must acquire solidity in their very inception, and their

greater size and force evince that they fall from a greater height than rain. Even the peculiar coppery cloud that brings them would suggest that the glowing upper atmosphere has penetrated the frozen zone and had its plethoric vapors suddenly congealed into icy pellets.

Space is not allowed for the further discussion of the subject, and we will only add, that when it shall have been more fully examined and thoroughly digested, we shall undoubtedly be the better qualified to comprehend and appreciate the affirmation of Scripture where it says: "Let there be a firmament in the midst of the waters, and let it 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 it was so."

CHAPTER IV.

SOIL, CLIMATE, VEGETATION.

"Now gentle gales,
Fanning their odoriferous wings, dispense
Native perfumes, and whisper whence they stole
Those balmy spoils." MILTON.

THE geographer of this day makes his fine flat maps, paints them with many colors, and stamps them with symmetrical lines of latitude and longitude. Yet this is but form, for he is compelled to cross them all

with other waving, crooked, isothermal lines even to approximate the truth. He divides the earth's surface with his tropics of Capricorn and Cancer, his torrid, his temperate, and frigid zones—mere creatures of his fancy, suggesting how it ought to be. Every continent possesses within itself all the different zones. Africa amidst her heats, and equatorial South America, each can point to Arctic ices, with lichens and mosses on mountain tops, with the temperate flora upon their sides. In northern Siberia the resident, for ten long months, is wrapped in furs and woolens to keep him warm. Suddenly summer comes, short and burning hot, when he throws off all his clothing, and, even in a state of nudity, still complains of heat. The Siberian plain, ascending as it approaches Himalaya, keeps cold the air until summer comes, and then it comes at once. No progression exists in the march of heat to temper the body, and make its intensity tolerable.

Not so with Adamland. Its climate, like the hues of the rainbow gently melting into each other, maintained an even and steady progression from the fervent heat of the equatorial cloud-ring to the frigid ices of the poles. No harsh features distinguished zones—they glided into each other like light and shadow. Abrupt and sudden transitions were utterly unknown; all was mellow and imperceptible graduation, order, and harmony. The surveyor's chain could mark the approach of winter, the mile-stones from north to south would indicate the temperature, with as much precision as the scales of Fahrenheit and Reaumur. Would you know the order in which the members of the vegetable kingdom arranged them-

selves, each in its proper place, take but a vertical section of a snow-capped mountain from the equatorial regions and lay it upon its side, and you have, in miniature, the Flora of the happy land.

THE SOIL of this primitive world we can but know was good, though not everywhere equal and alike. One portion in soil and climate excelled the rest, and was styled the garden of Eden, or delight. In it grew all that man could ask or desire, without other labor than mere horticultural dressing. Eastward of the district known as Eden was the poorest portion of the Adamland, known as the land of Nod, or "the fugitive or wanderer." It refused to yield full recompense to the agricultural labors of its possessors. With this exception the soil was rich. It was all virgin, fresh from the laboratory of Nature's proficient Chemist. It needed no additions of carbonates, nitrates, or sulphates; neither was it deficient in phosphates or ammonia, in argil or silex. They were there in boundless profusion. The learned tell us, that if but a single pair of herrings had been made at the beginning, and had increased without interruption, they would now form a mass as large as the earth itself! They also affirm, that if the bones of all the animals that have lived were still remaining, they would form a heap three miles high over the whole globe! These and all the other elements of vegetable and animal life, our coal mines, forests, trees, shrubs, vines, and plants were in our virgin earth and its surrounding gases. With the exception of Enoch and Elijah, who were transported bodily, every atom of matter existing now existed then, for matter is in-

destructible. Its form it may change, and change again, but the elements ever remain, to assume new shapes, to make new bodies. To-day a man, to-morrow grass; then a beast, a bird, a reptile; and then, again, food for man, perhaps man himself. All is moving, growing, declining, dying, and springing into new life again; and from this manifest transmutation of matter has sprung "the transmigration of souls," the dimly speculating mind failing to distinguish between the perishable atoms of the body and the imperishable spirit that dwells within it.

But what has become of all those herrings? Why are they not here? They have formed the bodies of great whales and other fishes, and Scotchmen, too, and French and English! And the bones? They have made the plants, the creeping thing, the beast, and man, proud man. Imperious Nero might only boast the decayed carcass of a dead hyena; and the proud senator, less powerful, though not less cruel, may glory in his aggregated atoms of defunct tom-cats or stinking cod-fish. Dust thou art, and to dust thou shalt return, is wilfully ignored whenever man by chance is placed above his fellows.

> "Your fortune cannot change your blood,
> Although you strut, as if it could."

That our soil contained all the elements that pertain to organic life, is attested by the fact that, at their Master's call, a ready response was given. "Let the waters bring forth abundantly," "Let the earth bring forth the living creature," were no sooner uttered by the Great Spirit than the atoms aggregated together,

and bodily forms appeared. So had the Omnipotent made the waters and the earth.

Vegetation.—With a soil so composed, and climate so peculiar, we may readily conceive that the vegetable world should present characteristics not seen in ours, and that the differences should be as great as the causes that produced them. No portion of the present earth combines and enjoys the supreme advantages of the Adamland, and none, therefore, exhibits the true character of its vegetation; and a comparison instituted between the diversified soils and climates with which we are acquainted can at best afford, by relation, but a dim appreciation of its merits. From the frigid zones to the equator, animated nature gradually increases not only in numbers, but in beauty and form. The intense cold of long continued night presents life in the polar regions as in a state of protracted slumber. A slight heat of but few days invites the sombre and dwarfed lichens and mosses to awake, and enjoy only an ephemeral existence, but without any exhibition of beauty or ornament. The members of the animal kingdom are but few, and of these the most vigorous are found in the waters that are warmer than the inhospitable air. In the temperate regions greater and gradual development is seen as we recede from the poles. Vegetation is diversified, and increases in the number of kinds, as well as in character and nutritive properties. Immense forests of oak and evergreen firs and pines afford shelter to the increased numbers of the animal world, and yet there is, in the modesty of color, and the diminutive leaf, an indication that light and heat

have not wrought in their forms the fullest development. Within the tropics, however, where day and night are more equal and continuous, and where life is more regularly urged forward by uniform supplies of nutritive elements, the fauna and flora exhibit their greatest perfection. The vegetable species are more than treble the number of those of the temperate zone, and far surpass them in size and beauty. The ferns and kindred plants attain the proportions of trees, and even the grass family is represented by towering bamboo, affording material for the construction of edifices. The forests, interlocked and overrun with broad-spreading vines, exhibit a majesty and density inconceivably grand. It is in this zone that Nature, in colors of living light, adorns her creatures in dazzling splendor, and confers upon them ferocity and vigor, as well as gigantic size. Appearances, however, are often deceptive; and this magnificent embroidery, these gay wreaths and festoons of flowers, are often mere tinsel, more specious than solid; and, whilst affording a feast to the eye, do not always supply a commensurate repast to the body. The dishes are splendid and highly adorned, but the bill of fare is too often meagre and scant.

South America, saturated to excess with moisture, furnishes an instance. With her the vegetable world is gigantic; offering the largest leaves, the tallest trees and vines, with the most expanded flowers. Her animals, however, are dwarfed starvelings and the most inferior of earth. The sloth, armadillo, and ant-eater, are contemptible creatures—her tapirs and peccaries—lama and paca, more large yet defective, seek the dry sides of the mountains—her

monkey family is extremely degenerate ; and even her felines, her jaguar and ounces, are deficient in size, as well as in vigor. She can only boast of her reptiles, that revel in moisture—for this she can furnish in unlimited extent. The same is true with regard to North America, but in a less degree.

In Southern Africa, where but little moisture prevails, upon burning sands, immense herds of elephants, giraffes and antelopes, are sustained by seemingly meagre pastures and stinted shrubs and herbage. The lion, tiger and hyena, exhibit a ferocity and vigor unequalled, even by the more luxuriant climate of Asia. Would you have hides and horns, the tall and waving grasses of Brazilian pampas will furnish them; but milk and butter in abundance you will get from Iceland, warmed by the Gulf waters and bedewed with fogs. It is only in the regions of little rains, but heavy dews, that the fruits of earth attain the greatest perfection. Excessive moisture makes the flower and the fruit look luscious to the eye, but denies to the taste the anticipated pleasure its appearance promises. Dewy Persia affords the richest peaches, almonds, and nectarines, the most dainty lemons, pomegranites, citrons, melons, figs; her oranges are exquisite, and the grapes and wines of Shiraz are truly ambrosial. Arabia, the happy, with her deserts and her dews, furnishes fruits as exquisite as Persia, and is redolent with the odors of her spikenard and saffron, her aloes, frankincense and myrrh —and her aromatic coffee, transplanted to the West Indies, has become a synonym for insipidity. The flowers that grow in the different regions of the world bespeak, in the aromatic oils they elaborate,

the nutritive characters of their respective homes. Our perfumes are almost wholly derived from districts that are rainless, or nearly so. Egypt abounds in fragrant flowers, and furnishes the world with the attar of roses. Africa is the nursery of bulbous roots, and confers upon the hothouses of civilized Europe their richest treasures, and even its forests in the East are pregnant with perfumes. Arabia and Persia are equally replete with sweet odors—and the latter rejoices in a whole "paradise of roses." The table lands of Peru, as well as the elevated plateaus of Languedoc and Provence, where dew abounds and rains are rare, are famed for the extreme fragrance of their flowers, and furnish the practical perfumer with the elements of his art. It is to the dew-drop, analyzed by light and heat, and furnishing to the plant its hydrogen, that the vegetable is indebted for its aromatic oil; and the same is true, whether that vegetable be flower or grass, herb or shrub, or seed or fruit; where dews abound, nutritious properties are elaborated. The observant alchemist of the olden times, in seeking for the "Elixir of Life," made "dew" the basis of his "liquor of immortality." The analytic chemist of our day tells us that man and beast, bird and plant, are each composed of three parts of water, and one part dust and ashes; so too the globe itself consists of three fourths ocean and one fourth dry land—indicating the source and proportions of those constituents. We certainly are well diluted in this post-diluvian world, and well entitled to the instability of water.

The Adamland, as will hereafter be seen, comprised one-third part of the earth's surface, and was no-

where subjected to the inequalities of climate we experience. No excessive rains occurred, to drench and dilute the bodies of its creatures, but daily supplies of genial mists and dews met all their wants as they accrued. Even and uniform currents of air, constantly brought them the gaseous elements of life, without sharp transitions from heat to cold, to check the progress of their growth. Serene and cloudless skies admitted such uninterrupted accessions of heat and light, as were necessary to secure the full development and maturity of both the animal and vegetable kingdoms.

Thus constituted, with its fauna and flora distributed in their proper latitudes, we may readily conceive, that all attained their full and complete perfection. The tropics abounded in gigantic palms, broad-leaved bananas, the bread-fruit, the orange, the lemon and citron—with climbing vines, festooning the forests, redolent with aromatic fragrance. The great trunks of trees increased continuously and homogeneously in size, without pausing to rest and form rings of annual growth, and even the equisetum, or horse tail, and club mosses, assumed the arborescent form. Outside the tropics the oak, beech, chestnut, the fruit trees and vine, harmoniously met the great conifers, the pines, larches and firs—and all rejoiced in an order of things which secured to each its full measure of vital enjoyment, without aught to mar it, in its pursuit of maturity and excellence.

Such were the conditions of life in the Adamland —and herein we have another striking *contrast* between that ancient world and this.

CHAPTER V.

NATURAL HISTORY.

Frae the pure air of heaven, the same life we draw—
Come gi'e me your hand, we are brethren a'.

"ALL flesh is grass." When the goose eats grass, she, by a nature conferred upon her by her Maker, converts it into goose-flesh; and the fox that eats her, only feeds upon the grass that first formed the goose. But all flesh is not the same flesh; "there is one kind of flesh of men; another flesh of beasts; another of fishes, and another of birds." So, too, all grass is not the same. In our irregular and diversified world, the vegetable kingdom ever presents itself in varied forms and characters. No two continents possess the same configuration, nor the same altitude above the sea, nor the same physical features under the same latitude, and, in fact, no one continent preserves throughout its bounds uniformity in its characteristics. The grass or plant derives the elements that constitute its body not only from the soil, but from the air and gases that surround it. Soil, light, heat, moisture, air, and the gases, unite themselves in combinations ever varying, and to such extent that no ten miles square of this world's surface preserves throughout a uniformity in the conditions essential to organic life. In one region the pine abounds, in another oaks. The walnut, chestnut, the palm, the orange, each has its habitat, where the conditions of

their respective existences are found. In one district, sugar or tobacco flourishes best, but in the next adjoining, perhaps, it is wheat, or rye, or corn. The nutmeg of Australia, whilst it attains the size and form, yet fails to generate the rich aroma of that of Ceylon. The hemp of India, transferred to Europe, no longer elaborates its intoxicating resin, but becomes solely a fibrous plant. The same grape in France, upon adjoining slopes, varies in the wines produced. The animal kingdom, built up and sustained by the vegetable, should exhibit corresponding differences in its divers members; and they, it would seem, should be really greater than they are found to be. The wonder is, not that the same races, under dissimilar conditions, should differ, for that is reasonable, and should be looked for, but that they should have any resemblance at all. How the vital spark, under variant influences, and from heterogeneous elements, is enabled to gather the little atoms that form its body, and so unite them as to preserve the least similitude to its distant kindred, is truly marvellous. One class of learned naturalists, finding the same races of plants and animals variant in their different regions, have concluded, that as distinct species they have so existed from the "beginning;" and unable or unwilling to account for their world-wide distribution, at once cut the gordian knot, and say, that all organic matter was created in specific centres, and that man and beast, and bird and plant, were made and placed, in the regions of their modern existence. This school of philosophy would have us to adopt their own crude conceptions, as a substitute for the word of God, and as more rational than the

account of the creation furnished by its Author. That they should think so, is extremely natural if they are judged by their writings. From The Types of Mankind, a large octavo, expressly designed to expose and demolish Genesis, we cite as follows:

"Another question of much interest to our present investigation is, Have all the individuals of *each species* of animals, plants, &c., descended from a single pair? Were it not for the supposed scientific authority of *Genesis*, to this effect, the idea of community of origin would hardly have occurred to any reflecting mind, because it involves insuperable difficulties: and science can perceive no reason why the Creator should have adopted any such plan. Is it reasonable to suppose, that the Almighty would have created one seed of grass, one acorn, one pair of locusts, of bees, of wild pigeons, of herrings, of buffaloes, as the only starting point of these almost ubiquitous species? The instincts and habits of animals differ widely. Some are solitary, except at certain seasons; some go in pairs, others in herds and shoals. The idea of a *pair* of bees, locusts, herrings, buffaloes, is as contrary to the nature and habits of these creatures, as it is repugnant to the nature of oaks, pines, birches, &c., to grow singly, and to form forests in their isolation. As regards bees, it is natural to have but one female for a whole hive, to whom many males are devoted, besides a large number of drones. Again there are animals which are impelled by nature to feed on other animals. Was the first pair of lions to abstain from food until the gazelles and other antelopes had multiplied sufficiently to preserve their races from the persecution of these ferocious beasts? So with other carnivorous animals, birds, fishes and reptiles."

This is the view of the scriptural account of creation, entertained by that class of philosophers who

would undermine the fabric of revelation, and in its place substitute a structure of their own, as the pattern of faultless perfection. It is not at all surprising, therefore, that in the scripture they should find insuperable difficulties," and assert "that science can perceive no reason why the Creator should have adopted any such plan;" for no such difficulties or plan are anywhere found in the pages of scripture. Genesis is evidently abused by those who have never discussed or read its teachings. It is not affirmed or suggested in Holy Writ, that in the beginning a single seed of grass, or "one acorn," was planted to raise up pastures and forests; but, on the contrary, it is distinctly and expressly stated, that the full-grown grasses and trees, each bearing seeds of its own kind, sprang into existence when called, and then not singly, but abundantly. So, too, with locusts, bees, wild pigeons, and the others cited; they came in numbers, with directions to increase and multiply their races. Had the authors read the Book that they hoped to demolish, the idea of starving lions and other carnivorous races, waiting for gazelles and antelopes to grow, would never have occurred and furnished to them this "striking illustration." The world, before the flood, was so entirely unlike the present in every form and feature, that no true parallel can be drawn between them. Organic forms, therefore, of this the nineteenth century, can furnish no evidence of what they were at the "beginning," and the dogmatic philosophy erected upon such premises rests upon a basis wholly fallacious and unreliable.

Professor Maury, after deeply and philosophically contemplating the general laws which govern the

physical agents of the universe, their happy adjustments and equipoises, reaches the unavoidable conviction that "if there had been more water, and less land, we should have had more rain, and *vice versa;* and then climates would have been different from what they are now, and the inhabitants, animals and vegetables, would have varied from their present state." (Phy. Geog. of Seas, § 211.) The correctness of such a conclusion will not be denied or doubted by any one conversant with the ways and works of nature. The difference between the ancient world and the present was immensely great, and, in fact, they should be accepted as the very antipodes of each other. This consists of many irregular continents, diversified throughout with hills and mountains, separated from each other by as many seas and oceans, themselves bespotted with myriads of islands, standing isolated and in clusters; that, was one great continental plain of nearly uniform surface, with a single broad ocean washing its shelving shores. Such a diversity between the principals would necessarily insure a corresponding difference between their respective members, their climates, animals and vegetables, and the divergence between them would be inconceivably great. In perfect accordance with Professor Maury's philosophical conclusion, does the sacred writer describe the ancient Adamland. From the creation to the flood, he informs us—and until Nimrod's day, more than a century thereafter—there were no carnivorous races. Man did not feed on flesh, neither did beast or bird, or other created thing, feed upon his fellow. All were vegetarians, herbivorous

beings; for, from climate, the field and forest could fully supply their wants.

In the outset of life, the Creator prescribed to his creatures the antediluvian law, as follows:

"And God blessed them, and God said to them: Be fruitful and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea, and over the fowl of the air and over every living thing that moveth upon the earth.

And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit yielding seed: *to you it shall be for meat.*

And to every *beast* of the earth, and to every *fowl* of the air, and to every *thing that creepeth* upon the earth, wherein is life, *I have given every green herb for meat;* and it was so."

Thus clearly, but imperatively, was the law propounded to the creature, that the vegetable should constitute his food; and the question is, did they obey it? Moses leaves us not in doubt, but emphatically answers in the affirmative," And it was so." All, then, were vegetarians, philosophers of the Pythagorean school.

To such a state of things, so plainly but unequivocally unfolded, some, yea many, may demur and be disposed to doubt. It is very natural that they should, for we, short-sighted beings, are ever inclined to judge the whole world by the little that surrounds us. It is hard for some to realize that the tiny mustard seed, which, with them, makes but a pitiful garden plant, in the East becomes a tree and affords to birds a shelter. That, in Peru, the juice of the leaf of the cocoa plant not only dispels hunger and stays

the wear and tear of the body without other food, but, upon the porter, confers the power to transport, without oppression, the heaviest weights across the steepest mountains. The hemp plant in the torrid zone is valued for the gum and resin that it yields, a grain or two of which exhilarates, enlivens and intoxicates, and oftentimes produces the strangest and most wonderful nervous impressions. If a person be under its influence, and his arm or leg be raised, so it remains, as a figure of wax, regardless of the law of gravity. All this is taught us, not by reason, but by actual observation. So, too, the India man refuses to believe that water, in another zone, can become hard enough to sustain his elephant's weight. To him it too plainly appears contrary to the laws of nature. Many things exist in distant parts of the earth, which, when first related, have excited the smile of incredulity, as being too inconsistent with what was already known to obtain belief. Yet experience has established, that what to-day may be deemed the "traveller's lie," to-morrow may become a certainty.

How unnatural does it seem to us, that in the Asiatic islands there should live a little fish, "the fly shooter," that brings down his game—the flies and insects that flit in the air above him—by spirting water from his mouth with direct aim upon them. And that another fish, the "climbing perch," should leave his native element and wander over the land to a considerable distance for five or six days, and actually climb the trees. When the continent of New Holland first became known, it opened to the world a capacious volume of wonders, and presented nature

as reversing herself; and if the following account of it were written on the sacred page, instead of "Goodrich's Natural History," from which we take it, and New Holland were unknown, it would present an "insuperable difficulty" to the philosopher. "There the cherry-stones were found growing outside of the pulp; the big end of the pear next to the stalk. Nettles, ferns and grapes grow into trees; and lilies, tulips and honeysuckles assumed almost the substantial form of oaks. There, too, were found, wolves, foxes, rabbits, squirrels, sheep, rats, mice, or creatures very much like them, engaged, some in hunting and devouring other animals, some in climbing trees, some in flying through the air, some in grazing upon the earth, and some in swimming in the water; and the females of all carrying about their young ones in their pouches, which serve as cradle, bed, house and home to the little family. Nor is this all. We have not only black swans and white eagles, singing pheasants, and a thrush, that in consideration of its music is called a laughing jackass; but we find one quadruped that seems to be both ant-eater and a porcupine; and another that is said to have the habits of a mole, the bill and feet of a duck, and the internal formation of a reptile." (1, 664.)

These seeming anomalies and eccentricities are received as true, upon human testimony alone, yet they are so great, that if the scientific naturalist, before their discovery, had been consulted as to the possibility of such existences, he would unhesitatingly have pronounced them impossible, as opposed to the well established laws of nature, and contrary to the very organization of plants and fishes, birds and

beasts. In coming to such a conclusion, he would be governed entirely by those laws, and that measure of organization, with which he was then acquainted. He has since extended the area of those laws.

These things are truly marvelous and wonderful; far more so than that bears could live on beans and pumpkins, and lions thrive on nuts and grass. When the natures of vegetable and animal food, as found in this our watery and disjointed world, are duly considered and compared, so slight are the differences existing between them, that we can readily comprehend, that under the serene sky and in the genial climate of the Adamland, the green herb would not only be sufficient for the support of animal life, but that it would really prove more nutritious than the lean animal food that the carnivorous races now live upon.

As Professor James F. Johnston has already and ably instituted such a comparison, we cannot do better than quote a portion of what he has written on the subject, in his interesting work, the "Chemistry of Common Life:"

"If a piece of fresh beef be dried in the hot sunshine, or in a basin over boiling water, it will shrink, dry up, diminish in bulk, and lose so much water, that four pounds of fresh, newly-cut beef will leave only one pound of dried flesh.

"Again, if we take a piece of lean beef and wash it in separate portions of water, its color will gradually disappear. The blood it contains will be washed out and a white mass of fibrous tissue will remain, to which chemists give the name of *fibrin*. Of this fibrin, the lean part of the muscles of all animals consists; it is, therefore, the principal constituent of animal flesh. It resembles the gluten of plants very closely in composition and properties, insomuch

that, in a general comparison of animal with vegetable food, we may consider them for the present as absolutely identical. Thus we have separated our beef—besides the small quantity of blood and other matters washed out by the water—into three substances: water, fibrin and fat. Its composition, as compared with that of wheaten bread and wheaten flour, is represented as follows:

	Lean Beef.	Wheaten Bread.	Wheaten Flour.
Water and blood, . . .	78.	45.	16.
Fibrin or gluten, ...	19.	6.	10.
Fat, ...	3.	1.	2.
Starch, etc., ...	..	48.	72.
	100	100	100

"Lean beef, therefore, agrees with wheaten flour and bread in containing water and fat; only in beef the water is as great as it is in the potato, or the plantain. It agrees with them also in containing a substance—fibrin—which represents, in the animal, the gluten of the plant. The main difference between beef and bread is, first, that the flesh does not contain a particle of starch, which is so large an ingredient in plants; and second, that the proportion of fibrin, in ordinary flesh, is about three times as great as in ordinary wheat bread. In the *dry* matter of flesh also, the proportion of fibrin is greater than that of gluten in any known vegetable food, and very much greater than in dried bread, made from any of our cultivated grains.

"The flesh of *wild* animals is represented very nearly by the lean beef, of which the composition is given above. Wild animals generally contain little fat; but it is not so with our domesticated animals, and especially such as are reared for food. Fat, to a certain extent, represents and replaces the starch of vegetable food.

"We have seen that, as a whole, there is much analogy between the bread and the beef—the vegetable and the animal forms of food—on which we live. Between the gluten of the one and the fibrin of the

other, we have also found a very close similarity, and that, in the animal economy, they are both fitted and intended to serve the same main purpose. If we compare the fatty portions of both, we find new resemblances. Most of the varieties of fat yielded by our common European vegetables are fluid and oily at ordinary temperatures. Such is the case with the fat extracted from wheat, oats, from Indian corn; from linseed, from the olive, the poppy, the walnut, etc. The fat of the palm, however—commonly known by the name of palm oil—and some other vegetable fats, or butters, are solid in the natural state and even at ordinary temperatures. And even the oily fats—olive oil, for example—when exposed to a low temperature, congeal or freeze to a certain extent, and allow of the separation of a solid fat in a greater or less proportion. On the other hand, those which are solid yield, to pressure, a quantity of liquid fatty oil, so that, in reality, all vegetable fats consist of two fatty substances, one of which is solid and the other liquid at ordinary temperatures. Now, the same is the case with the animal fats, with those of beef and mutton, for example; with the butter of milk and with the oil contained in the yolk of the egg. All consist of a solid and a liquid fat, and in this fact we see a new analogy between our vegetable and our animal food. Thus, as there is a kind of identity in nutritive quality and value among the compounds, represented respectively by gluten in plants and by fibrin in animals, so there is an absolute identity of substance, as regards their solid parts at least, among the fatty compounds which are met with in the eatable productions of both kingdoms.

"In another matter of detail, I might show how, in still more minute matters, animal and vegetable kinds of food are nearly identical. When the parts of plants and animals are burned in the open air, they disappear for the most part and leave only a small proportion of ash behind. This ash consists of a mixture of various substances, spoken of as their mineral, earthy, saline or inorganic constituents. This mixture of

mineral matters obtained, consists, in either case, of the same substances, only differing more or less in their relative proportions. The same things occur in the ash of bread as are found in the ash of beef.

"In whatever degree, therefore, the nutritive properties of our food depend upon the kind of mineral it contains, it is almost a matter of indifference whether we live upon an animal or a vegetable diet." (Vol. i., ch. 6.)

We are thus taught, by the learned professor, that wild animal food agrees perfectly with the vegetable, in the saline and earthy portions; that in each, the nutritious oils are identically the same; and the only difference between them is, that the fibre of the animal is all gluten, whilst the vegetable is composed of the same gluten with an additional quantity of starch.

The saline and earthy portions are necessary, chiefly in the formation of the bony frame and skeleton, and these exist abundantly in the vegetable kingdom, for beast or bird.

The oily element is useful in engendering and preserving the heat of the living body; and so good a non-conductor of heat is it, that a good coating of fat insures a greater degree of warmth than many blankets. The Esquimaux, amidst his northern ices, gorges himself with the luscious fat of the seal and walrus, and will quaff his quart of whale oil with stronger gusto than our southern epicure a glass of port or claret. His object is to keep out cold. A little farther south, men eat much animal food, but do not crave the lean and glutenous fibre, for it is too poor, they want the oil. The Englishman must have his beef, choice Durham or Devon, and his mutton, Leicester or South Down, as fat as they can be made.

He wishes to get fat himself and provide against the cold and humid atmosphere that surrounds him. The Frenchman, farther south, again, deals less in fat. He wishes to be cool and comfortable, and eats more olives, figs, light soups and pastry. The character of the climate, in a great degree, prescribes the kind of food that man consumes. The oils are essential, where cold prevails, as a protection; and, in warmer regions, a portion is needed as a substitute for the starchy element.

The gluten or fibrin of all food serve to build up the body, and repair the waste of limb and blood and muscle. This nutritious element is not always constant, but varies greatly, not only in different plants, but in the same in different latitudes. In some it reaches as high as thirty-eight per cent, instead of ten, as cited in the analysis of European or English wheat by Professor Johnson. The heat of the southern sun increases the quantity greatly, as attested not only in Georgia and Alabama, but in Italy, Sicily, Barbary and Egypt. The ancient world excelled these States, as much as they do the more northerly latitudes, in those physical agencies of Nature that promote the development and maturity of plants. In the sunny South, too, the starch is found converted, either wholly or in great part, into sugar, and the oily olives, figs and fruits. The palm, banana, bread-fruit, and other nutritious vegetables, indicate to us, that if so little difference now exists between the plant and the lean flesh of wild animals in our watery and changeful world, in the Adamland, with its persistent climate and genial influences, the plant itself would really afford more nutritious

pabulum than the carnivorous races can now derive from the diluted fibrin of his degenerate victims.

In a large portion of the world, men and beasts indulge but little in animal food; the roots, fruits and grains suffice them. The truly carnivorous races are really but few, many of those so called being omnivorous, eating fruits and roots as well as flesh, and it may even be doubted whether those called carnivorous are at all *impelled* by *Nature* to live *entirely* upon animal food. So to affirm because we see them do it, is illogical. We deny to them any vicious propensity, all depravity of nature, and accord to them a most virtuous obedience to the laws of their created state. Such a conclusion is unsustained by our acquaintance with the lower races. On the coasts of Arabia, where fish abound, and vegetation is scarce, the natives feed their domestic animals on fish; should we, therefore, denominate such animals piscivorous, and dogmatically affirm that they, by nature, are impelled to subsist upon the finny tribe? By the same logic we should answer, yes. And so, too, we should pronounce the Englishman carnivorous, though it is not nature that drives him to fat beef and mutton, even to keep out cold and moisture, as he affirms, for the laborer on his farm does well with bread and cheese and a mug of ale. The Scotsman thrives and labors on oatmeal and milk, the Irishman on potatoes. By far the larger portion of mankind live on vegetable food, and many of them upon the simplest kind. In Patagonia, the largest of the human race live upon the nuts of the araucarian pine; and in other portions, the bread-fruit, sapsago, banana, palm, fig and olive, supply all nature's de-

mands. Why, then, are some so extremely carnivorous? Because they have tasted flesh and blood, relished it, and found that it required less labor in their digestive functions to assimilate it; and, having the power, they have determined to gratify their sensual appetites. So, too, the lion, tiger, and hyena; they have tasted blood, and, having the power, they secure ease in their digestive labors, and gratify their carnal appetites, equally as much as man. They might certainly, if so disposed, partake in some measure of vegetable food, especially as it contains the very substance they live upon, when they eat gazelles. The domestic cat, a perfect pattern of the bloody tiger, not only likes her crumb of bread, but mews for it; the domestic representative of the wolf, the dog, eats not only bread, but nuts and fruits, revels on persimmons, and actually fattens on the raw meal of maize. In India the priest keeps, as a pet, the great Bengal tiger in a cage, and feeds him solely on rice and milk; yet he lives and thrives as well as if nourished with kids and lambs. The very manner in which the ferocious beasts bring up and train their young, strongly suggests that their carnivorous habits are less natural than acquired. Take lions, for example, as stated by Goodrich.

The lioness generally brings forth a pair of cubs in some dense and secluded ravine. Even whilst cutting their teeth—the most dangerous and important crisis in lion life, during which very many die—their parents bring to them fleshly food, carefully torn in shred and pieces. At the age of from four to five months they are taken to the edge of the woods, there to receive their food; and, by witnessing the

manner of killing game, to teach their young ideas how to shoot. At eight months they are permitted to practice themselves on kids and lambs. When older and larger, they assail the more powerful cattle, but their extreme awkwardness subjects them to many wounds and bruises, and their sire, watching in the distance, is often compelled to come to their assistance. It is not until two years old that they can despatch scientifically a horse or ox, and for proficiency they remain, until three years old, under parental direction and superintendence. During this long period the native suffers immensely in his herds and flocks, for the lions not only kill to eat, but to become proficient in the art of killing.

This is the mode and manner of the carnivorous training, and exhibits too much and too long a culture to enforce the belief that goat-catching and blood-eating come by nature. The little chicken readily picks up his crumb, the turkey or gosling his blade of grass, without instruction, and the little pig his grain of corn, as soon as he can run abroad. But the naturalist affirms that the lion's teeth are carnivorously constructed, and he must fulfill the office for which he is thus evidently designed by nature. The lesson of the ravine, however, contradicts his theory, and asserts that lion's teeth are but the forced adaptations of his organs to his unnatural mode of life; and that they are only acquired in his infancy, at the peril of his life.

However this may be in our irregular and disfigured world of changeful winds, unsteady temperature, and alternating rains and drought, in Adam's day it was not so. Then the green herb, quickened by genial

and continuous heat and light, and nourished by enlivening mists and dews, matured in full development the gluten with the oil, the sugar and the starch; man and beast found ready for their use their bread and meat conjoined in every plant. No necessity or depraved appetite drove the races to prey upon each other, but all found a sufficiency in the fields and forests of Nature. They not only lived upon the herbs, but attained enormous sizes. It was then and there that those huge creatures flourished whose remains are found preserved in the fossil strata of the present earth; the mastodon and mammoth, the gigantic rhinoceros and hippopotamus, megatherium, paleotherium, anoplotherium, the immense stags, as large as modern elephants, and bears larger than our horses. The birds of that primitive age were also incredibly large, to judge from the few evidences that still exist to attest the fact. The great albatross found in England, with the dinornis of New Zealand, and epiornis of Madagascar, are even excelled by one of the cassowary species, whose track in New England measures 18 inches in length, and would indicate a bird of immense dimensions, weighing perhaps from 600 to 800 pounds, and four times as great as that of the modern ostrich. The reptile tribe, the alligators and crocodiles, dignified with the classic appellatives ichthyosaurus, plesiosaurus, megalosaurus, and iguanodon, excite the wonder of the man of science by their prodigious size; and even the fishes of the ancient seas, from the uniformity of their appearance and other characteristics, seem to have sported in an ocean of equable climate and regular depth, undisturbed by great fluctuations. Although the Scriptures

are silent as to the inhabitants of the waters, their anatomical structure affirms that even they were not carnivorous. As a general rule these ancient races were four times the size of their kindred of the present day, and exhibited less diversity in their leading features.

For the production and support of such massive and peculiar beings, the geologist and palæontologist are driven to the conclusion that, during the period of their existence, the earth must have enjoyed the climate of the tropics from pole to pole. Yet this, we have already shown, would be absolutely impossible, with the earth as it is, divided into continents, and everywhere diversified with mountains. The Adamland, however, supplies the grand desideratum fully in its climate and vegetable kingdom, and also conforms to Professor Maury's philosophical axiom that a change of worlds would insure a change of creatures. They all lived before the flood, and there we have found for them an appropriate nursery and a suitable habitation.

When Scripture tells us that all the races in the primitive world were herbivorous, it really imparts to us a much greater degree of knowledge. It says to us that the social state was necessarily one of peace and harmony, where man did not pursue the beast, nor the brute oppress his fellow. It is fear alone, the consciousness of danger, that drives the inferior creatures into the wastes and jungles, and keeps them separated from each other. Remove the apprehension, and sociality amongst all is at once established. Our domestic animals all attest the truth of this. The little fish soon learns to come to the tinkle of a

bell and take their food from the human hand. The lion, the leopard, and the falcon, have each been tamed and trained to aid in the sports of the field. In the uninhabited Galapagos Islands, Mr. Darwin found all the birds, the finches, doves, and hawks, so tame that they might be killed with a switch; and, on one occasion, a mocking bird alighted on the edge of a pitcher held in his hand, and quietly sipped from the water it contained. In the city of Charleston the black vultures are prized as scavengers, and their peace and safety are secured by municipal regulations. Feeling no fear, they enjoy their civic rights with great self-complacency, and encumber the markets and side-walks regardless of the passing citizens. Even snakes have domesticated themselves in dwellings, when permitted and protected, and become perfectly free and familiar with the members of the family. Lions have lovingly chosen inferior beasts as associates and companions; and cats have adopted mice as foster children, and licked and loved them with a mother's care and feelings.

We thus see, that in primeval times, unmoved by dread, all God's creatures might naturally live in amity and good fellowship together. That they did so, is represented to us, not only in the facility with which the patriarch Noah managed his motley group, but in the order and readiness with which they, unconstrained and as a flock of sheep their shepherd, followed him and his into the ark of safety.

But to remove all doubt about it, Moses beautifully paints a scene between extreme and opposite characters, in the garden of Eden. There he exhibits our Mother Eve, the embodied type and pat-

tern of all her timid and fearful daughters—*tete-a-tete* with the wily and odious serpent. No fright, no terror, no alarm or dread, not even awe, is manifested on the part of either. She fears not the reptile, neither does he assay to flee her presence; but most composedly and familiarly do they hold their chat, on abstruse ethics, on life and death, right and wrong, and moral good and evil. Such is his picture of life before the flood, but how differently does he paint it in his own case and day! He tells us, that when at Horeb, in his Maker's presence and at his bidding, he cast his staff upon the ground, and to his horror it became a serpent; and then, not frail and timid woman, but he, the great statesman, philosopher, jurist, the captain general of the hosts of Israel, *fled from it.* If we but look upon these two opposing scenes, from the same artistic pencil, we can be at no loss to reach their meaning. In the one he unfolds the antagonism, existing between the post-diluvian races; and by the contrast, he in the other, intends briefly to impress the fact, that in the ancient Adamland,

"The wolf and lamb did dwell together, and the leopard laid down with the kid; and the calf and the young lion and the fatling together; and the little child did lead them.

"And that the cow and the bear did feed with their young, lying side by side; and that the lion ate his straw like the ox.

"And that the suckling child did play on the hole of the asp, and the weaned child did put his hand on the cockatrice's den."

Such, would the sacred author have us fully to understand was the social condition of the primitive

earth, and in this he affirms another contrast between the ancient world and this.

CHAPTER VI.

PRIMEVAL MAN.

Intent on high designs, a thoughtful band
By forms unfashioned, fresh from Nature's hand.

As might be expected, in turning from the satelites to man, as the primary planet around which the lower orders of creation revolve, the sacred writer becomes more diffusive and full. He communicates much that is interesting, and far more than is generally supposed. The ancients, from the circumstances surrounding them, were forced to compress their thoughts into the narrowest compass, and the brevity of their writings necessarily tends to make them obscure, particularly so to us, in this age of expanded folios, diffuse octavos, and ephemeral fleeting works, the reading of which is accomplished in the progressive spirit, with rail road speed. The ten short chapters devoted to the Adamland, written in the ancient laconic and comprehensive style, will tolerate no such flitting inspection. Part should be compared with part, and the whole be sifted with searching care, if we would reach the true and full extent of the author's meaning.

Were the first sons of Adam white or black, brown or red, has sometimes been discussed as an open and debateable question, although an explicit answer stands recorded upon the sacred page. Surely Moses would not blink the complexion of our primitive ancestors, whilst particularly describing their ages, sizes, food, and other characteristics, as he fully does.

He informs us, that when the boys and girls grew up, "The sons of God saw the daughters of men, *that they were fair*, and they took them wives of them as they chose." By the term "fair," he intends to be understood, that they were white, as we in this day less accurately express ourselves. The usage and relative force of these two words, in olden times, are well defined in scripture: The one "white," being most commonly applied to colorless inanimate matter, as linen, milk, snow, or to the skin diseased as in leprosy; the other "fair," to designate the hue of the healthy living body. When Abraham took Sarah down to Egypt, he is represented as fearing that the fair complexion of his wife would captivate the eyes of the *dark skinned* sons of Ham, excite their lust, and lead to his death. And "the Egyptians beheld the woman, that she was *very fair*." So, too, Isaac, when he took Rebekah unto Gerar, feared the Philistines, other swarthy sons of Ham, "because she was *fair* to look upon." These parties, Abraham and Isaac, Sarah and Rebekah, were white we know, and if by the expression fair, white is not meant, why such apprehension on that account, when visiting these dark skinned races? If only contour or feature are intended, then Abraham and Isaac were weak and

silly, in supposing that symmetry of form was entirely confined to their wives, and that Egypt and Philistæa could produce no duplicates. The context clearly indicates that color, not form, was intended. But at a later day Solomon uses the phrase, and then defines it: "O, thou fairest among women; My beloved is white and ruddy; the chiefest among ten thousand;" and this is perhaps the first and only instance where the word white is used to denote complexion. Thus our historian informs us that the primitive daughters of earth were white, yea, white and ruddy, even as were Abraham, Isaac and Jacob, and as their descendants are in this our day. And if their daughters were, so were their fathers and brothers, else, by physiological laws, in four generations, they themselves would most surely have lost their fairness. They then, all, fathers and sons, mothers and daughters, were white, beyond a cavil or a doubt.

A change of worlds would ensure a change of its inhabitants, and so Moses affirms:

"There were giants in the earth in those days. And that when the sons of God came in unto the daughters of men, and they bare children unto them, the same became mighty men, which were of old, men of renown."

The oriental drapery of this verse has so mystified its simplicity, as to furnish to the learned commentator a marvellous abstrusity, which he has not at all diminished by his attempts at explanation. In his view, by the phrase, "The sons of God," we are to understand the righteous sons of Seth, and by

the daughters of men, "the wicked seed of Cain;" and that from such unnatural marriages a powerful race of renowned, but wicked, giants sprung. This comment is neither satisfactory nor intelligible, and really requires a greater degree of explanation than the original text itself. Why a "daughter of man," should be construed to mean a sinner, is inconceivable, especially as the phrase, the "son of man," repeatedly occurs throughout the scriptures, but never as imputing wickedness. Neither is it unfolded to us, how those ancient marriages between the families of Seth and Cain should have been productive of such a prodigious growth of flesh; and not even are we enlightened as to the relative parts and functions exercised by sin and righteousness, respectively in the great mystery of reproduction. These abstruse matters unexplained, renders the comment worthless, for "the interpreter really needs the most interpretation of the two."

Although the sacred author does not inform us how it was, he most explicitly states that "there were giants in those days;" not a few or some giants, as the commentator infers, but a race of gigantic beings. The reference to the sons of God and daughters of men is too clear to be misunderstood, and simply means men and women. The language is figurative, and common with the orientals. It is the ordinary Bible method of speaking of women, and nothing more frequently occurs, upon its pages, than the phrases "daughters of Jerusalem," "daughters of Tyre," of Egypt, Chaldea, and so on; indicating the sources whence they come. To avoid tautology, the writer varies his terms and uses metaphor. But

whence did he receive his poetic idea? From what source derive the association of thought that he has thrown together? Simply from the manner of the creation of the respective sexes. Only in the chapter but one preceding, had he written it down, and it was still fresh in his recollection. Man, he had said, had come from the hand of God direct, and hence he is styled the Son of God; but woman's source is from the side of man, and Adam is made to say, "she shall be called woman, because she was taken out of man." Conforming to the oriental style, he styles the sex as daughters of men, in plain allusion to their origin.

Method is observed in imparting information, as will be readily seen by a reference to the sixth chapter. In the first verse, we are informed that children were being born and growing up; in the second, that marriages were occurring between them in the adult state; and in the fourth, that the fruit of these marriages were giants, and that they, of the olden time, were men of renown.

In his laconic way, the sacred writer affirms the continued existence of this giant race, after the flood, but in a state of gradual and protracted declension. He alleges that it lingered even until his day and only ended with the death of Og. "Only Og," says he, "king of Bashan, *remained*, of *the remnant* of the giants;" a brief expression in itself, yet pregnant with instruction, when read in connection with his antediluvian history.

In this statement, our author is well supported by the traditions of mankind. In every part of the globe have legends of a primitive race of giants been found existing, as universal as that of the flood. Out

of the multitude, we shall cite a single one, and that not from the untutored savage of the wilderness, but from the classic sons of Greece. From Babel, Japhet and his sons possessed themselves of the "isles of the Gentiles," in after ages known as Greece, or the Grecian Archipelago. Here his descendants multiplied and prospered, and preserved, in "poetic fable," the tradition of their origin. They claimed Japetus—the Greek for Japhet—as their progenitor, and named him as one of the Titans. These they averred were a race of giants the sons of heaven and earth—a paraphrase for sons of God and daughters of men—who, at an early day, had combined together to scale the heavens and make war upon the gods, but by whom they were overthrown. This tradition evidently points to the discomfiture of Noah's sons at Babel, and distinctly avers that the Grecian progenitor, Japhet, and his brethren, were all giants. So, too, they had their Titanides — or giantesses in their mythology — the wives and daughters of the Titans, preserving consistency in their legendary lore. With this Japhetic account of early life, does that of the sons of Ham perfectly agree; the Egyptian tradition, as to their ancestry, being almost identical with the Grecian memorial of this primitive race of Titans or giants. The scriptural account is that of Shem, so that the descendants of the three brothers all unite in testifying to a common fact.

Before entering upon another view of this matter, it is necessary to premise that man is but a bundle of mathematical proportions, a mass of algebraical quantities, a problem in geometry. From head to heel, and in all his parts, from the smallest to the greatest,

he obeys the potent law of numbers. So manifest is the fact, that in all ages the different members of the body have been adopted as standards of admeasurement. The nail, the digit; the palm, the span; the forearm as the cubit, have been used in the place of barleycorns and inches. Strict proportions, too, exist throughout the body. The head is divided into four equal parts: from the top of the head to the forehead is the first; the forehead, to the top of the nose, is the second; the nose itself, the third; and thence to the chin is the fourth. The height of the figure is eight times the head, and divisible regularly into eight equal parts; and the arms extended at full length give the height of the body. Twice the circumference of the thumb is equal to the wrist; twice the wrist equals the neck, and twice the neck gives the circumference of the waist; and so on, throughout the various parts of the body are relations found to exist. Man must be, therefore, subject to the law of numbers and proportions.

If the ancient sons of Adam bore the same relation to the beasts of their day, that we do to those of ours, they should have been twice our height, or between eleven and twelve feet high. Moses did not measure Og, king of Bashan, and therefore does not certify to his proportions; but he gives us the dimensions of his bedstead with particularity, so that we may draw our own conclusions. It was, by his measure, thirteen and a half feet in length and six in breadth, after the cubit of a man, and thus confirms our estimate as obtained by a comparison of the races.

If we scan the genealogical table of the Adamland

we ascertain that the average length of primitive life was 926 years; and we also observe that, as in the case of Mahaleel, the age of 65 is the earliest period at which a man is recorded to have become a father. If we accept 64 years as the age of puberty, we have data for our numbers, and may proceed to institute a comparison between ancient and modern lives and sizes.

"A stingy fellow, 'tis no matter who,
"Had once upon a time some work to do;
"He told a negro man, called Sam I think,
"That if he'd do his job, he'd give him drink
"Such as could not in any place be sold,
"For it was then exactly ten years old.
"The work is done, the miser gives the dram,
"How old do you call dis, Massa? says poor Sam.
"Ten years exactly. Ten years! in a rage
"Says Sam, He be d—n little of his age."

So simple is the law, that governs growth, that here poor negro Sam declares it. He in his plain, rude way, announces a sound and profound physiological truth. The man of science, who has carefully watched the progress of the human form through all its changing phases, gives us with precision, the erasof its development and decay, its growth and waste, and many facts that establish its subserviency to the law of numbers and proportions.

"From birth until puberty," says, Dr. Draper, "the mode of life is essentially vegetative, all the instincts having relation to the individual and corporael development. Except through the intervention of education, the desires of the child are chiefly directed to the pleasures of mere vegetative existence, eating and drinking; and this in savage races is witnessed

in a much more marked manner than in those that are civilized, in whom the manner of life is affected through the intervention of parental care. At the period of maturity, the object of life has undergone an entire change; the vegetative propensity, or that for the exclusive development of the individual, has declined in prominence, and the reproductive has been assumed. With this, there have been awakened new sentiments, and new emotions, affording still another proof of the connection of mental habitudes and structural conditions." "In every organism, the assumption of the reproductive state is the signal that the end of development is at hand."

"With respect to the relation between weight and height, if man increased equally in all his dimensions, the weight would be as the cube of the height; but, since this is not so, the development taking place unequally, the proportion is not observed, and it is found, that from the end of the first year to puberty, the weights are as the squares of the heights."—(Human Physiology.)

The physical fact, thus enunciated by the man of learning, as well as unlearned Sam, is but the simple affirmation, that prior to the age of puberty the body is purely in the vegetative or growing state; and, during that period, the living spirit within is busily engaged in gathering and putting together the little atoms that are to compose its future dwelling place, in which to perform the functions of after-life. Hence, if the age of puberty in Adam's day was 64 years, and in ours but 16, the corporeal tenements erected by Adam's sons, should be four times as large as ours; that if they were building four times as long as we, then they should quadruple us in magnitude. In other words, that they should be twice as high and twice as broad as we are, accord-

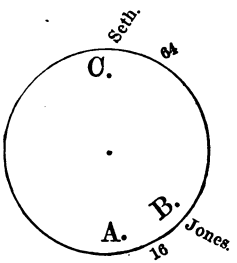
ing to the ascertained rule of the human form; that instead of the cube, it is the squares of the heights that measure its proportions. If we take five feet eight as the standard of our day, then eleven feet, four inches should have been the general average in primeval times. Thus, it is clear, whether we make a comparison with the beasts of earth, or follow the voice of tradition, or accept Og's bedstead for our guide, or yield to mathematical convictions, the conclusion must be one and the same, "that there were giants in the earth in those days;" and that they were twice our height, and four times our weight and bulk; men of such might, that their renown of the olden times had reached even to Moses' day with certainty.

In all this there is no marvel, nothing that should even excite surprise. Even in this disjointed world of ours, experience teaches, that a quiet and simple mode of life, with an abundance of nutritious food, and a salubrious atmosphere, secures not only large, but graceful and well proportioned forms. The Patagonians are the giants of this day, exceeding seven feet in height. The Laplander and Samoides, on the other hand are dwarfs, scarcely exceeding four. It is only a few years ago, that Frederick the Great rejoiced in a body guard of Swedes, whose least, height was eight feet three inches. Individual cases have been preserved in history, that manifest the size that may be attained under peculiarly favorable circumstances. Charlemagne was seven feet. The Roman Emperor Maximinus exceeded eight feet; Gabarus, in the reign of Claudius, was nine feet nine inches. The Emperor Andronicus was ten feet—and

Pusio and Secondilla, in the reign of Augustus, are said to have been ten feet three inches in height. In the ancient continent, the conditions of life were well adapted to the greatest development of animal forms, and if individuals in our world of vicissitudes can acquire the giant size, it is not at all incredible that in the earliest ages all should have done the same. Even here we find a disproportion between existing races and nations, equally as great as that between the ancient and the modern times. All marvel, then, should cease; to believe in giants is not superstition. They existed, not by some mysterious combinations of sin and righteousness, but from the strictest law of nature.

But then, it is said, they lived so prodigiously and incredibly long! They would not die, naturally, as we do now, at three score and ten, and that sounds like fable. Life is not an accident, nor is its measure a pure matter of chance. All things temporal—the winds, the clouds, the hurricane and storm, the great ocean, with its tenants great and small, even the solid rock that is slowly crumbling into atoms—all yield obedience to inflexible law, and life itself is no exception. All around and about us, that we can see or know, is force and motion. There is no stand still here. Things are either growing and increasing, or else diminishing and decaying. Life, viewed in its physical aspect, as connected only with the things of time, is *motion:* motion conforming to a circle. From earth it rises, ascends and culminates; then diminishes, wanes and descends to earth again: "Dust thou art, and to dust thou shalt return," indicates the circle. All bodies moving in such lines are impelled

by two opposing forces: the one, called centrifugal, would throw it off at every point; the other, centripetal, would draw it into the centre. By these two opposing powers, it is constrained to keep the circular path, and their joint operation is styled the central force or forces. If by this law we compare the extended lives of the primitive sons of man with our own, we discover that, as in their bodies, so in their lives, do they conform to the harmonious law of numbers, and that their longevity was well and truly apportioned to their other personal endowments. The law of forces, in this case, we shall endeavor to exhibit in the simplest possible way, disregarding the usual mathematical formulas, and, for illustration's sake, select Mr. Jones, who, as an ubiquitous personage, and extensively known, may be accepted as a fair exponent of the modern race; and, for the olden times, we take Mr. Seth, Adam's well known son. Taking the ages of puberty, as the common and corresponding point in the lives of the respective parties, we describe a simple circle, and make A the starting point of both, representing the hour of birth.



The vital force that impels Mr. Jones from birth to

puberty, will take him from A to B. This we mark 16, for 16 years; and that of Mr. Seth will take him four times as far. This we lay off from A to C, and mark it 64. Now, it is self-evident, from this simple representation, that the force that moves Mr. Seth in the orbit of human life, is greater than that which impels Mr. Jones; and, if their bodies were equal, the proportion would be as four to one, as through such relative distances they have been carried. But Mr. Seth is four times as large and heavy as Mr. Jones, and consequently, the force necessary to move his body, four times as great, to four times the distance, to accomplish the common point of puberty, must be sixteen times as much as that of Mr. Jones. If these initial forces were continued undiminished through life, then Mr. Seth should have lived sixteen times as long. If we consider that circle as 58 years, representing the orbit of Mr. Jones's life, and his vital power is sufficient to take him around it once, then the vital power of Mr. Seth will take him around the same 16 times, and make his life equivalent to 926 years; and these are the proportions actually existing, as near as they can be attained, in our day. It would seem, then, that as a matter of natural right, the ancient patriarchs were well and fully entitled to the very protracted lives they enjoyed.

But here we may be asked, where are the centrifugal and centripetal forces? What the opposing powers, that prescribe this circular motion as the orbit of human life? Moses affirms that man's body is made of clay; but the true and inner man is the breath of God; and so, too, St. Paul, "Know ye not that ye are the temple of God, and that the spirit of

God dwelleth in you?" Then, for the conflicting powers we have that eternal breath divine, which, at each point in the circle of life, would flee away and soar on high; and the coarser particles of clay, the earthly temple, seeking its own, would fall again to earth. Whilst one would rise above, the other would sink below, and, in their opposing natures, act as the two contending forces. So felt the inspired apostle when he wrote, "The flesh lusteth against the spirit, and the spirit against the flesh; and these are contrary, the one to the other, so that ye cannot do the things that ye would." (Gal. v. 17.)

As in the life, we have found the law of forces surely ruling, and the limbs and members of the body truly and wisely apportioned to each other, so further searching, we also find that the very little atoms that compose that body are ruled by laws equally as strong and certain. The chemist tells us that the simple elements are but few in number, yet they, combining according to fixed and established laws, give rise to the many varied and complicated forms around us. That the atoms that compose the enduring granite are not widely different from those that form the tender herb. Yet all are subject to law alike. The continued existence of these forms depends entirely upon the law of their respective chemical affinities. Man's body partakes of this ever-ruling principle. The infant may be born with a vital power that would take it through an orbit of an hundred years; yet, at any period of life that power may be met and opposed by other antagonistic forces, which may reduce its limit or suddenly overcome it. Accident, imprudence, or design, may shorten the natural

span of life. Any uncongenial element introduced within the system—a drop of prussic acid, or a particle of matter from the viper's fang—at once destroys the natural affinity between the atoms; they no longer act in concert, and death ensues. A matter less active may work more slowly, yet gradually weaken, and at length destroy, the cement that binds the different particles together.

When the sacred writer recites, "In the day that thou eatest thereof thou shalt surely die," he but affirms a fact that is compatible and familiar with scientific knowledge. Our common-school philosophy teaches that when a body is at rest, so it will ever remain, unless impelled by some extraneous force, for it cannot put itself in motion; and so, too, a body once put in motion cannot stop itself, but will move on forever, unless it be impeded or subdued by other countervailing forces. The proficient Chemist that formed the enduring granite, the never-failing air, and ever-abiding water, himself selected, from his replenished laboratory, the varied atoms that composed the body of his creature—man. His cunning hand wonderfully put them all together, each bound to other by the strongest affinities. No unfriendly, not a single malign particle, not an atom to war upon the rest, did he put in. A body thus composed might vie with brass and marble, yea, excel them in persistence. To it, finished thus in perfect form, he gave an even portion of the breath divine, and set the mass in motion. Equally balanced, these centrifugal and centripetal powers were adjusted to roll on in an endless orbit of human life, as scripture and philosophy say they would, and might have done, had not the adjustment

been impaired. In the garden there grew a fruit, containing a poisonous principle, that would dissever the chemical ties that first so firmly bound the atoms into one harmonious whole, and finally cut the silver cord of life. This Adam tried; and to his dismay he found, too late, that as acid poured on marble, so within him now existed the elements of decay. Within the garden, near by the first, there grew a second tree, the virtues of whose leaves or fruit would prove an antidote to the poison of the first, and, if introduced, would pursue and chase it in the system, and overtaking, would combine with it and neutralize its noxious powers. But to Almighty wisdom it seemed just and best that Adam should pay the penalty affixed to sin, and suffer for his folly. That it took nine hundred years and more for the leaven of the forbidden fruit to work its way throughout the frame of Adam, evinces clearly the wise and cunning way in which that frame at first was fashioned.

As the first parents could impart no more than they themselves possessed, so Seth only could receive a body tainted with the first infection, and Noah, too, from Seth; and we all from Noah have inherited bodies envenomed with corruption. Sound Philosophy then proclaims, as loud as Revelation, that "*the wages of sin is Death.*"

The man born blind has not the remotest idea of color. He who knows no fault, knows no perfection; he who knows no vice knows not virtue, and he who knows no law, knows not sin. It is totally immaterial what the fruit was that Adam tasted, whether betel-nut or poppy, pear or apple. As soon as he

partook thereof his eyes were opened, and he knew good from evil; for a still small voice within him spoke it loudly to his ear, that he had broken faith with God. Adam when first created, with his living soul and perfect body, was as unconscious as the pure and simple child of the existence of either good or evil. A life of virtuous guileless innocency was his first estate, with the unerring wisdom of his heavenly parent to guide him. Following that implicitly, he might have enjoyed an endless life of terrestrial bliss, the "halcyon days of youth" forever. But in an evil hour he cast away the polar star of Almighty wisdom, and in its place set up his own dim, imperfect judgment, by which to steer his course in life. He thus arrogated to himself the knowledge of good and evil, and arrayed himself in opposition to his Maker. For such insolence and presumption he is cast down from his first high position, thrown upon his own self chosen powers, and taught to feel and know, that every thought and word and deed of shortened life, will at its end be subjected to Heaven's unerring scrutiny. Refusing to take it for his guide, he is compelled to accept it, as the measure of all his self-sufficient works. Was he worthy of an endless life, so to sin, rebel and everlastingly defy his Maker? To unceasingly affront and provoke him with his nauseating and self important pretensions? No: probation was the wiser and better state for fallen man, to enable him to see the error of his choice, and again regain the happy state he lost. Thus in the title page of human life is found revealed the later teachings of the Gospel.

Next, the inquiry follows, why were the periods of

antediluvian life and puberty so much greater than they are in the present day? Why are we cut down to our short three score and ten? It is not often that man can presume to seek the reason why his Maker does this and that; and he is always too proud to discern the how of His ways and doings. Yet this may not be one of the hidden or forbidden mysteries, and an attempt to answer it can only prove instructive.

Man, truly, is a spirit, dwelling in a tenement of clay, the body being but a tent or tabernacle in which he resides during his sojourn on earth. That spirit feels and says it can live as long as the aged Methuselah, yea, throughout eternity; and yet it can but see that the tent cloth, which it has woven for itself out of the earthy matter around it, is subject to decay. When it looks back upon the phases and changes through which it has passed in life, and observes the many various forms it has assumed in different periods of its progress, and the extreme dissimilarity between its succeeding ages, it, notwithstanding, is still convinced that the body only has changed, and that he himself is the identical being that once enjoyed his mother's nursing care and father's chastisingh and. The degeneracy, then, is not in the being, but in the tent cloth that covers it. The centrifugal force, the spirit, is as strong as in the olden time, to fly its orbit and soar away, and not more so; but the centripetal, the earthly portion, is too enfeebled to bind it down to earth longer than for our diminished span of life.

However we may speculate, yet it is certain that the elements composing the bodies of the oldest

times were pure, vigorous, strong, and fresh from nature's laboratory. Ours are derived from a soil that was once the ocean's bed. Here on this earth's surface, over these mountains, hills, plains and valleys, for centuries sported the finny tribes. The bodies that we wear now, are but the long-worn, cast off debris of defunct organizations; worn and re-worn, first in one form, then in another. At once a whale, then a minnow, perhaps again a mollusk, a madrepore or reptile. Thus ever in use and ever changing, they have become degenerate and imperfect, and like scrap metal oft remelted, unfit for lasting service. The manufacturer gathers cast off rags and worn out cloths, and tears them into shreds and tatters. These he cards anew; he dyes, he spins and weaves them and makes an article that looks like genuine cloth, but it is not, it is only shoddy. So, too, with our tent-cloths; they to the eye at first look well, but they cannot last, for they are only *shoddy—shoddy.*

"It is not growing like a tree
"In bulk, doth make man better be,
"Or standing long an oak three hundred year
"To fall a log at last, dry, bald and scar;
"A lily of a day
"Is fairer far in May;
"Although it fall and die that night,
"It was the plant and flower of light!
"In small proportions we just beauties see;
"And in short measures, life may perfect be."

BEN. JONSON.

CHAPTER VII.

CIVILIZATION, ARTS AND SCIENCES.

Intent on high designs, a thoughtful band,
By forms unfashioned, fresh from Nature's hand.

Upon this diversified earth there are but few regions, and they at greatly distant points, that afford even a dim and indistinct prospect of the many pre-eminent advantages enjoyed by the sons of Adam-land. Yet these few have not failed to elicit the attention of philosophic minds. Peru, Mexico and Egypt, all rainless countries, have furnished instances of civilization so ancient, that their origins are traced back to, and actually lost in, the misty cloud of obscurity that ever overhangs the dawn of history. The philosopher thence concludes, that man, when surrounded by such advantages of soil and climate, is necessarily and irresistibly urged from low and grovelling barbarism to the higher and polished state of civil life. In this he errs; for although it is true, that such conditions, as aids, are eminently conducive to civilization, they cannot be accepted as its origin. Did the rainless swamp or jungle of Egypt first entice the sons of Ham, and then subdue and polish their savage natures, or did the hidden treasures of the happy valley first attract their sagacious eyes, and invite its reclamation? Did the requisite irrigation of the thirsty soil unfold to the barbaric eye the science of geometry, or did his previous

knowledge of art and science direct him in his selection? Would our explorer of antiquity but view the sacred page, simply as a history as faithful and reliable as that of Pliny or Tacitus, Manethe or Berosus, he would find beyond the flood, another rainless country, worthy of his consideration. From it he would learn that the thread that leads him to the *pre-historic* times of Egypt or Babylon is not there ended in misty gloom, but through it is continued back to Babel, and thence again, beyond the flood, its extended length continues to the very dawn of human life.

Egypt, it would seem, is left to us as a miniature sample, a pocket specimen of the antediluvian world, and presents valuable suggestions as to the happy condition of its great original. True it is, the copy with its imperfections, its annual floods, mechanical irrigation and partial dews, is not as perfect as its type; yet it affords an idea, as to what a rainless world might really be. "The economical year," says Malte Brun, "presents a perpetual circle of labors and enjoyments." In January, lupins, the dolichos, and cummins are sown in Upper Egypt, while the wheat shoots into ear; and in Lower Egypt, the beans and flax are in flower, the vine, the apricot and the palm tree are pruned. Towards the end of the month, the orange, the citron and pomegranate trees begin to be covered with blossoms. Sugar cane, senna leaves, and various kinds of pulse and trefoil, are cut down. In February, all the fields are verdant; the sowing of rice begins; the first barley crop is harvested; cabbages, cucumbers and melons ripen. The month of March

is the blossoming season for the greater part of plants and shrubs. The corn sown in October and November is now gathered. The trees which are not yet in leaf are the mulberry and the beech. The first half of April is the time for gathering roses. Almost every sort of corn is cut down and sown at the same time. Spelt and wheat are ripe, as well as the greater part of leguminous crops. The Alexandrian trefoil yields a second crop. The harvest of the winter grain continues during the month of May; Cassia fistula and benné are in flower; the early fruits are gathered, such as grapes, Pharaoh's figs, carobs and dates. Upper Egypt has its sugar cane harvest in June: the plants of the sandy ground now begin to wither and die. In the month of July, rice, maize, and canes are planted, flax and cotton are pulled; ripe grapes are abundant in the environs of Cairo. There is now a third crop of trefoil; the nenuphar and jessamine flower in August, while the palm trees and vines are loaded with ripe fruits, and the melons by this time have become too watery. Towards the end of September, oranges, citrons, tamarinds and olives are gathered, and a second crop of rice is cut down; at this time, and still more in October, all sorts of grain and leguminous seeds are sown; the grass grows tall enough to hide the cattle from the observer's view; the acacias and other thorny shrubs are covered with odoriferous flowers. The sowing continues, more or less, late in November, according to the degree in which the waters of the Nile have retired. The corn begins to spring before the end of the month; the narcissuses, the violets, and the colocasias flower on the dried lands; the nenuphar dis-

appears from the surface of the waters; dates and the sebesten fruit are gathered. In December, the trees gradually lose their foliage; but this symptom of autumn is compensated by other appearances; the corn, the long grass and the flowers everywhere display the spectacle of a new spring. Thus in Egypt the land is never at rest; every month has its flowers, and all the seasons their fruits. (2. 435.)

"There is a country," says Dr. Draper, in his late interesting work, 'The Intellectual Development of Europe,' "in which man is not the sport of the seasons, in which he need have no anxieties for his future well-being—a country in which the sunshines and heats vary little from year to year. In the Thebaid heavy rain is said to be a prodigy. But at the time when the Dog Star rises with the sun, the river begins to swell, a tranquil inundation by degrees covering the land, at once watering and enriching it. If the Nilometer which measures the height of the flood indicates eight cubits, the crops will be scanty; but if it reaches fourteen cubits, there will be a plentiful harvest. In the spring of the year it may be known how the fields will be in the autumn. Agriculture is certain in Egypt, and there man first became civilized. The date, moreover, furnishes to Africa a food almost without expense. The climate renders it necessary to use for the most part a vegetable diet, and but little clothing is required. It is said that it costs less than three dollars to raise a child to maturity.

"The American counterpart of Egypt, in this physical condition, is Peru, the coast of which is a rainless district. Peru is the Egypt of civilization of the

western continent. There is also a rainless country or strand on the Pacific Coast of Mexico. It is an incident full of meaning, in the history of human progress, that in regions far apart, civilization thus commenced in rainless countries."

If thus it be that these little epitomes can, by their excellence, demand such admiration and applause from modern minds, how much more should be awarded to their transcendant prototype? If the incident be full of meaning that civilization delights in rainless regions, how surely shall it be found in the more highly favored world, the ancient Adam-land?

Civilization commenced with Adam, and from him has come in direct line to our day. It is the normal state of man. No untutored savage can take up his bed and walk, without the helping hand or healing voice of some higher power. Man may fall from his high estate, and become the father of a wild and savage race, but never, without help, rise again. Europe, for a millennium, was debased with a gloom of mental night, and would have so remained but for the light that flashed from proud Saladin's polished scimitar, and illumined the western world again. In the midst of every population, there will be men who become restive under the restraints of civil life, and prefer the wilderness for their home; others, driven by vice or crime, seek security in exile. Here, they ignore the ways of the social state, increase and multiply, and at length become a horde of savages. Even the poet of the dainty city can sigh:

> "Oh! for a lodge in some vast wilderness,
> With boundless contiguity of shade."

When God created man, he did not breathe into him the breath of life to make a savage. No! Adam was a stately patrician, and his helpmate, Eve, his virtuous equal. When first seen, they are found in a garden of true delight, dressing it. Horticulture was the first pursuit of man—an art that pleases and well becomes a heart refined, but never attracts a savage. From the garden removed, in the field we find them next, engaged in the ennobling art of agriculture, and exhibiting by no means a barbaric trait.

In early life, it is true, they wore no clothes; but then it was hot, and comfort required none; and perhaps they, with the poet, thought that they,

"When unadorned—adorned the most."

Besides they had come into the world most unexpectedly to themselves, and no previous preparation in the clothing line had been made for their reception; and, so far as our inquiries enable us to judge, we are inclined to the belief that in respect to their first condition, they in nowise differed from all other genteel and polished people; yea, it is said that even kings and queens make their royal entrée into life without a particle of clothing upon their bodies. This condition, however, was of but short duration—only a sort of "nine days'" wonder, for as soon as *they opened their eyes* they knew that they were naked. As a strategic shift, prompted by the urgency of the occasion, the fig-leaf was adopted as an article of dress. This, no doubt, was Eve's suggestion, for all her daughters, to this day, evince that from her they have inherited, not only "original sin," but a further

propensity to array themselves with leaves and vines and flowers and other botanic ornaments from Flora's garden. Adam, however, did not care a fig for such flimsy material, and he proceeded at once to tawing skins. Soon he had them ready, and mother Eve tastefully put on her tunic of handsome kid, and Adam donned his leather breeches—such as our fathers wore less than one hundred years ago, manifesting that these ancient people were six thousand years ahead of us in fashion. Next, they clipped Abel's sheep, gathered flax and cotton, and made them clothing, such as Jews and Gentiles, in later times, have been used to wear.

Next, the case of Cain and Abel discloses anything but that of the savage state of life. Before discussing that, it is necessary to premise that only the same rule that prevails in construing our deeds and wills and written instruments is requisite, to do the sacred author justice and attain his meaning. So construe it that each part may be consistent with all the rest, and the whole shall stand together. This is the more necessary, as many good people, superficially reading the book, have adopted the idea that Cain found his wife in the midst of another race, living in the land of Nod.

To prevent mistakes, the sacred writer pointedly tells us that Cain did not kill Abel in his boyhood, but that a considerable period of time elapsed before that event. The uncommon phrase "in process of time" is used by way of caution in this regard. From Eve's expression upon the birth of Seth, the inference is clear that he was born not long after the death of Abel. Now, Adam was one hundred and

thirty years old when Seth was born, and the inquiry arises, what were Adam and Eve about during that protracted period? Did they not have other sons and daughters? Were they less disposed than all their posterity to render a cheerful obedience to their Maker's first law to man, "to increase and multiply," and replenish the earth? They had many sons and daughters in that period, or else Seth begat Enos without a wife, and men in "his day began to call upon the Lord," who had never known a mother. It is by no means improbable that Abel left a wife and children. Cain's wife, too, came from Adam's loins, for Eve was called "the mother of all living." During this period, therefore, there were both sons and daughters born, yea many, and grandchildren too, constituting quite a community. It is true there is no *express* mention of them, nor are their names recorded in the generations of Adam, as stated in the book of Genesis. That list, however, does not profess to enumerate all the sons of Adam, neither does it, as some suppose, recite the names of the eldest and first-born of his successive sons. It is simply and only the genealogical tree of Noah, as kept and preserved by him, tracing *his* descent from his first primitive ancestor. No other names are recorded therein, save only those through whom he claims connexion with Adam. Had Eve given birth to fifty sons, before or after Seth, their names would not in this list be found recorded, simply because they did not pertain to Noah's lineage.

When Cain slew Abel he did it in the midst of people. He was surrounded by brothers and sisters, nephews and nieces, and, perhaps, by the child-

ren of his murdered brother. But when the cruel and unnatural deed is done, does he exhibit a single trait of savage nature? Does he lap the blood or tie the brother's bleeding scalp to his barbaric girdle? No; the scorpion lash of guilty conscience in all his words and deeds appears:

"Cursed with unnumbered groundless fears
How pale yon shivering wretch appears!
For him the daylight shines in vain;
For him the fields no joys contain;
Nature's whole charms to him are lost;
No more the woods their music boast;
No more the meads their vernal bloom;
No more the gales, their rich perfume;
Impending mists deform the sky,
And beauty withers in his eye.
In hope his terrors to elude,
By day he mingles with the crowd,
Yet finds his soul to fears a prey,
In busy crowds and open day.
If night his lonely walks surprise,
What horrid visions round him rise;
He feels fixed earth beneath him bend,
Deep murmurs from her caves ascend,
Till all his soul, by fancy swayed,
Sees livid phantoms crowd the shade."

How well the poet of civil life describes the case of Cain. Crying from the ground, his brother's blood continually assailed his guilty ear. He could read in every brother's face that he was loathed and spurned, and throughout the bounds of his once happy home he felt that he was sadly cursed. With dread and apprehension, too, he is constantly oppressed, "lest every one that findeth him shall slay him." Conscious of his guilt and fears, he feels that they are

plainly stamped upon his countenance and are visible to every eye. He can endure his pangs at home no longer, but flees the presence of his brethren, and seeks for peace and quiet in a distant land. Remorse, cruel, inexorable and unextinguishable, is the prompter of his thoughts and deeds; and such remorse, as depicted by the sacred author, is never known but in the heart of man, civilized and refined. Similar testimony again is furnished in the later case of Lamech.

Cain took his wife, and in the distant East became a wanderer, as the name of Nod implies. Here through life he seems to have been haunted by his brother's ghost, and his own fears of some pursuing hand of vengeance. For before he died, and after his posterity had multiplied, he built a city, crowned with the name of his first-born, Enos, a town fortified with walls for his protection, the very mention of which would imply that it was the only one of the kind in Adamland.

Our author, in the most complete, yet comprehensive way, imparts to us the fact that the primitive people were not only civilized, but in the happiest method communicates the extent to which they had attained in many arts and sciences. He does not specify in detail the smaller acquirements in each art, but at once announces their crowning points, presuming that we should possess discernment enough to recognize the truth that the major ever includes the minor.

A city, he tells us, has been erected in the Adamland, built too by human hands. This statement of itself implies a varied knowledge of the mechanic

arts: not only an acquaintance with the use of tools, but also the existence of a practiced hand to make them. A familiarity with numbers, proportions, dimensions, and the different kinds of material, are requisite to the accomplishment of such an undertaking. Could they build a city, then certainly they might encompass a cart, a wagon, a spinning-wheel and loom, and other matters of a lesser nature, that their wants required.

If they were proficients in the arts of building, either of wood, brick or stone, they were equally so in their management of the metals. They had their iron works, and shops and foundries for the manufacture of brass, in varied forms. Proficiency in the metallurgic art is communicated in the fact, not that they had their smaller shops, but that a "school of mines," or academy of the highest grade, was established, at which "*every artificer* in brass and iron" might receive instruction. This speaks loudly for the civilization of that ancient day, and implies much more than is so briefly expressed. A knowledge of mineralogy and the different kinds of ores, as well as the arts of mining, smelting, reducing and forging them, is requisite to make them available. In later ages, as history affirms, nations have ever been found first using the softer metals, copper, tin and zinc, and so compounding them as to make their necessary tools for trade and their varied implements of war. It is only in after years, when they have further progressed in the arts of civilization, that they have dared to assail the more useful but obdurate metal, iron. In Adamland they had attained that stage in

civilization, and not only enjoyed their brass, but subjected the more refractory metal to their use.

The ark itself, of such gigantic measures and proportions, with doors, windows, rooms and stories, and built by cubits, indicates a knowledge of the mechanic arts, and testifies, as to the character of their buildings, that they were truly more than rude and simple huts or savage wigwams. They kept their cattle, too, and enjoyed their clover butter and milk, and no doubt excelled the "English Dairy Cheese," that in our day is so abundant.

If thus proficient in the mechanic arts, we find them no less so in the arts polite. Music they had, and that of the ancient feeling kind, that could tame the savage breast, heal the sick, and almost raise the dead. We have none such now. The genuine art is lost. The skald and harper are numbered with the extinct species, and slumber with the fossils. To us it reads like fable, yet it holds its place in history. To furnish an example of the astonishing power of ancient poetry and music, we cite from Olaus Magnus the following story:

"A certain famous skald and harper, in the court of King Eric the Good, used to boast that he could raise and influence the passions of the human heart to any degree he pleased. The king, partly by promises and partly by threats, prevailed upon the artist, much against his inclination, to make the experiment on him and his courtiers. The skald began by singing such mournful strains and playing in such plaintive tones that the whole company were overwhelmed with sorrow and melted into tears; by and by he played such joyous and exhilarating airs that they forgot their sorrows, began to laugh and dance and shout and give every demonstration of the most unbounded

mirth; and last, changing his subject and his tune, he poured forth such fierce and angry sounds, that they were seized with the most frantic rage, and would have fallen by mutual wounds, if the guards, at a signal given by the harper, had not rushed in and bound them; but, unhappily, before the king was overpowered, he killed no fewer than four of those who endeavored to apprehend him."

Such is a description of the ancient harper's talent, based upon the electrical sympathies of genuine nature, which to us, in this day of studied art, when the heart is chilled with the continual pursuit of selfish gain, and the ear corrupted with the attractive clink of gold, appears incredible. Yea, says the rhymster, comparing the ancient with modern music:

> "Old Orpheus played so well, he moved old Nick,
> But thou mov'st nothing but thy fiddlestick."

The sons of Adamland had their music and enjoyed it. They had their harpers and their minstrels, who, yielding to the emotions of generous hearts, only discoursed such sweet and concordant sounds as nature prompted. That they had attained the summit of its excellence, is disclosed in the statement that they possessed the most perfect of musical instruments. The *harp*, standing at the head, may be accepted as embracing the different members of the *stringed* class; whilst all *the wind* sort are fully represented in their surpassing chief, "The Glory of Music," the organ. This accompanied them, when met together to "call upon the Lord," and the deep and thundering tones of its gigantic tubes, added to the resounding voices of giant men, give us strong assurance that when

united all, they truly did "loud anthems sing" to their Maker's praise.

Science, as well as art, was irresistible with a people so happily surrounded, and by every condition prompted to its culture. Their serene nights and pellucid atmosphere invoked a contemplation of the stars. Their protracted lives enabled them to observe and correctly measure the regular motions of the heavenly bodies and reduce them to a system. They were the fathers and the founders of the astronomic science. Men in the earlier and lower stages of civilization compute their time by the moon. She changes often and regularly; and her bright and silvery orb attracts attention, and it requires but a slight knowledge of numbers to keep the account of her monthly progress. A higher degree of attainment is, however, requisite, to follow and fix with precision the slow and gradual changes of the sun, that occupy a longer period of time. The odd number of 365 days that intervenes between his periodic visits to the same point of the heavens, could not be ascertained without long, watchful and continuous devotion to the observation of his movements, maintained through successive years. Yet these the primitive sons of Adam made, and by the movements of the sun were they guided in their computations of time. As we have now, so did they have then, twelve months, consisting of thirty days each, as appears in the narrative of the flood. A short additional month of five days, appended to the twelfth, gave to the solar year its complement. Originally, and Quaker-like, the months were distinguished by numbers instead of names, as were also the days of the week—a division

of time which we have received from our antediluvian forefathers. The beginning of the year, as disclosed in Exodus, began with the vernal equinox; and the learned say about the 15th of March. They also affirm that this constituted the ecclesiastical year, in contradistinction to the secular, which began about the 15th of September; but of this last there is no mention in the scripture. It does not appear that the primitive people had any common chronological epoch from which they reckoned occurrences, but were content to refer them to the year of the life of a leading or ruling patriarch, as the English lawyer cites the laws of his sovereign. This practice was not confined to them, but was continued after the flood, even unto the destruction of Jerusalem. The mode of reference is common throughout all history, sacred and profane. The prophecies bear the dates of the ruling kings, as in Isaiah, "it came to pass in the fourteenth year of King Hezekiah;" and later, in Luke, we read, "this taxing was first made when Cyrenius was governor of Syria." The Romans referred leading events to the different consulates, notwithstanding their "*urbe condita*" epoch; and the American people exhibit the natural disposition for short and familiar eras, by constant references to the several administrations of the Presidents.

That the ancient people were the founders of Astronomy, and of course familiar with mathematics, does not rest solely upon the ground that they were acquainted with and governed by the periodical movements of the sun. As well as the historian, the astronomer of the present day traces his science back to and loses it in the mists that overhang the ear-

liest history. To Egyptian priests and Chaldæan Magi would he ascribe its origin, and to them he awards the honor of first designing the groups of beasts and birds, which even now constitute the "signs," and adorn his celestial charts. But he forgets that priest and Magi derive their descent from Babel; and from this modern centre of human civilization it is but a short step backward to the serene and inviting skies of the Adamland. Those very charts, too, bespeak their antediluvian origin. Man, with the sprightliness of his imagination, is enabled to perceive, in the open flaming fire, in the leafy outline of the forests, and in the fleeting and shifting clouds of heaven, the divers forms of men and beasts and ships and scenes with which he is familiar; but never those with which he is unacquainted. The astronomer's map presents us with a motley group of bulls and bears and lions, harmoniously dwelling with kids and goats and little twins. Whose imagination could thus have fancied and painted such incongruous and hostile races in the skies? Who, in later days, could have, in their imagination, seen a state of things existing in the heavens, which they had never seen on earth? To the son of Adamland such a view was familiar, natural, and ever present to his mind, and required no stretch of fancy; and he, with his brush, readily painted on the vault of heaven a reflex picture of the scene on earth. That picture still remains to testify as to the amity of the first primitive social state, and confirm the accuracy of the sacred writer. A little more than one hundred years intervened between the flood and the assembling of Noah's sons upon the plain of Shinar. Here

they unite with ready hands in making brick, in burning them thoroughly, and, with slime in the place of mortar, at once engage in building a city with a gigantic tower, whose top might reach to heaven. It is to these people and their descendants, removed to Egypt, that the historian, philosopher and astronomer trace their knowledge and their sciences; to the authors of the famous and elaborate cities of the olden time, of Babel or Babylon, and Nineveh, of Rehoboth and Calah, of Balbec, Palmyra and Persepolis, of ornate Thebes and the massive pyramids. Did these degenerate sons of Noah, in this disjointed earth, with electric speed attain their civilization in a century, and their forefathers in the primitive world, under the most favorable auspices ever enjoyed by man, continue savages or semi-barbarians for sixteen hundred years? Such an idea is preposterous, such a conclusion unworthy of the domain of thought.

We are fully aware, that some there are who fondly dream that we, with our modern civilization, our borrowed lights, excel all others who have lived before us; yea, who are really unwilling to believe or admit that a giant race, larger than ourselves in size, could ever have existed. They would whittle down the genuine claims of others to a standard beneath our own, so as complacently to enjoy the pleasures of self delusion. Some such have imagined that the acquirements of the antediluvian people were only such as pertained to a beggarly set of unsophisticated boors; that their cities were only rookeries, their organs, simple pan-pipes; and their harps merely long-necked gourds, bedecked with cotton strings. Such conceits, whilst unduly vaunting a civilization

now scarcely four hundred years in age, but little more than half as old as Noah was when he built the ark, would equally depreciate the testimony, and disregard the language of one who knew full well the force and meaning of the terms he used. Moses was reared beneath the Royal Pharaoh's roof, in the midst of populous and polished cities; was skilled in all the wisdom of the truly learned Egyptians, and to him "the Lord made known his ways," and it is impossible to believe that one of his deserved repute should, either from ignorance or design, have so egregiously misrepresented the state and condition of the olden time. Tested by post-diluvian witnesses his descriptions are most abundantly sustained, and there is no room to doubt that his historic sketch of the primitive world is equally just and true.

It is impossible to believe that Gomer and Misraim, Nimrod, Aphur and Elam, and the sons and daughters born to Shem, Ham and Japhet, after the flood, were never dandled upon their parents' knees and heard from their impassioned lips glowing accounts of the ancient Adamland; that they alone, of all their race, were reared without legendary memoirs of a former age. Surely, their youthful and inquisitive minds often provoked their sires and grandsire to willing recitals and repeated rehearsals of the primitive world, its magnificent palaces and crowded cities, its hanging gardens, its culminating towers and massive pyramids, its arts and sciences, its fashions and its follies. To hearts thus tutored and inspired, to seeds thus sown, may we indubitably ascribe, as natural fruit, those earliest structures of human

hands whose very ruins now, in their splendor and immensity, excite both admiration and surprise

That our primitive ancestors really enjoyed the blessings of civilization, may thus be acccepted as indisputable, and this averment, plainly deduced from scripture, is not only uncontradicted, but thoroughly supported, as well by all the chronicles of the older times as by the researches of our later ages.

CHAPTER VIII.

POPULATION.

"For as the leaves, such is the race of man;
The wind shakes down the leaves, the budding grove
Soon teems with others, and in spring they grow.
So pass mankind. One generation meets
Its destined period and a new succeeds."—HOMER.

SOME men, reputed learned, exercising their talents more in undermining than in understanding the sacred scriptures, have suggested many obstacles to the belief of an universal deluge. Other good men and pious Christians, falling into the scoffer's snares, have surrendered unconditionally to strategic art, and as if willingly, and by way of balm to uneasy consciences, have *fancied* that the sons of primitive earth were but few in number, so few, indeed, that they could all easily be convened in some favorable spot in Asia, and then and there most conveniently drowned by

the bursting of some ideal lake, or other aquatic arrangement adapted to the purpose. Fancy, now leaving the scripture behind, must needs finish the picture she has begun. She next avers, most piously, that it would be inconsistent with Almighty power and wisdom to execute so prodigious a miracle, to waste so much water in a universal flood, merely to destroy a handful of erring creatures; that it would not comport with the ways of heaven, to

> "Uplift the club of Hercules—for what?
> To crush a butterfly, or brain a gnat;
> Create a whirlwind, from the earth to draw
> A goose's feather, or exalt a straw;
> Bid Ocean labor, with tremendous roar,
> To heave a cockle-shell upon the shore!"

This comes from fancy, not from fact. A first departure from the ways of simple truth is sure to lead into the fowler's snare, and end in entanglement in its meshes.

When God created man, he told him to increase and multiply his species, and further endowed him with incentives to insure a strict obedience. This law, as all other laws in nature, has its bounds and limits, and only a slight reference to them discloses that the population of Adamland could not be so easily disposed of by any little local flood in Asia.

Euler, the great mathematician of Berlin, devoted much consideration to the laws of population, and reduced the subject into a system. He based his calculations upon the proportions of births to deaths for given periods, and prepared a set of rules and ta-

bles, by which we may readily compute the ratios of a people's multiplication. From it we learn, that if the deaths be to the births as 10 to 11, a nation will double its population in 250 years; if the proportion be 10 to 12, it will double in 125 years; a proportion of 10 to 18 secures a doubling in 31 2-3 years; of 10 to 22, once every 21 1-8 years, and a proportion of 10 deaths to 30 births causes a people to double its numbers in periods of 12 4-5 years.

From the tables thus prepared, with an ordinary bill of mortality, of one in every 36 souls, it is seen that a people may double its numbers in the very short periods of twelve or twenty years. As this, however, is only theory, we shall cite, for stronger illustration, a few cases from practical life, well known and undeniable, and thus place the matter in the clearest light. To this end we should select a people placed entirely to themselves, cut off from all extraneous influences, and whose numbers have been neither increased nor diminished by removals. We cite the case of ancient Jacob and his sons, who went down into Egypt, seventy in number, and there remained for the space of 430 years to a day. Here, during that time, they were kept separate from the Egyptians, but multiplied exceedingly. For the first thirty years they were kindly treated—then they were persecuted and harassed until after Joseph's death, and after that event were reduced to a state of slavery. That they were well fed as slaves is sufficiently affirmed by their repeated longings for the flesh-pots, during their protracted wanderings in the wilderness. But "when the tale of bricks is doubled, then Moses comes." He leads them forth, and before he leaves

the borders of the land, he numbers them, and tells us there were 600,000 men on foot, besides a mixed crowd of wives, widows and children that followed. The average proportions of births to marriages is found most commonly to be from 3 to 5; and the ordinary proportion assumed in estimating population is fixed at 4 births to every marriage. As many of the men enumerated by Moses were probably old, and many of them unmarried, and yet, from the rapidity of their increase, we might assume the highest ratio to be clearly within the bounds of reason and credibility; yet to avoid all cavil, we shall estimate the 600,000 men as composing only one-fourth of the entire number of Jewish people; and this gives us for the aggregate of that host, 2,400,000 souls of all classes. To those unfamiliar with this subject, this number will appear extremely large, and the sceptic has not been backward in beriding the Mosaic figures as too extravagant for credibility. But why incredible? They are not only within the bounds of possibility, but of actual probability. Euler assures us by his tables and calculations that, under circumstances highly favorable to the propagation of the human race, the posterity of a single pair may in 300 years attain the number of 3,993,954. The Israelites were favorably located in Egypt for their increase, and did so rapidly multiply as greatly to terrify their masters, and yet in a period of 430 years, with more than 30 couple to begin with, we assign them but little over half the number a single pair might have produced in the shorter period of 300 years. Our estimate is then certainly fair, probable and reasonable, and thus proof against the sceptic's sneers. Here, in this case,

we find an isolated people regularly doubling its numbers in *periods of thirty years.*

Next we cite the instance of another people, similarly treated, but cut off from all extraneous influences, who, upon investigation, it will appear, have regularly doubled their numbers in similar periods of thirty years. We refer to the slaves of African descent in the United States, after importations from abroad were prohibited. From the census tables we learn, that in 1810 they numbered 1,191,364. Thirty years thereafter they doubled the same, and were in number, 2,487,355. In 1820 they were 1,538,064; in 1850 they doubled that, and were 3,204,313. In 1830 they were 2,009,031; and thirty years afterwards, in 1860, they doubled that, and exceeded four millions in number.

In these cases, we have two different nations, each impounded, that might have increased more rapidly, according to Euler's tables, yet actually doubling their numbers, at one and the same rate, in fixed periods of thirty years. And it is certainly worthy of remark, that one of them presents the case of the white man, held in bondage by the swarthy sons of Ham; and the other, the darker sons of the same Ham in bondage of the white—the result being the same in either case.

"Oh! that mine enemy would write a book," says Job. Well, he has, and we will produce it. The sceptic, who derides these Mosaic facts and figures, and flatly denies his flood, shall speak. Mr. Jefferson, in his Notes on Virginia (page 116), calculates the progress of population in that State, and affirms that the inhabitants of the Colony doubled their numbers in

even shorter periods than those we have deduced in the two cases above cited:

"During the infancy of the Colony, while numbers were small, wars, importations, and other accidental circumstances render the progression fluctuating and irregular. By the year 1654, however, it becomes tolerably uniform, importations having in a great measure ceased, from the dissolution of the Company, and the inhabitants became too numerous to be sensibly affected by Indian wars. Beginning at that period, therefore, we find that from thence to the year 1772, our tythes had increased from 7209 to 153,000. The whole term being of 118 years, yields a *duplication once in every* 27 1-4 *years*. The intermediate enumerations taken in 1700, 1748, and 1759, furnish proofs of the uniformity of this progression."

In this statement, the sceptic himself assures us that the Scripture's figures are not only reliable, but quite within the bounds of truth and fact, as he himself has carefully ascertained; and if either be suspicious, it should be his; for it is certainly very remarkable that a people who had so suddenly changed their climate, and subjected themselves to the privations and diseases incident to all newly settled countries, should have increased in numbers with such rapidity.

The population of the world is generally estimated at 1,000 millions, all having proceeded from the sons of Noah. Wars, pestilences, famines, earthquakes and volcanoes, fires and floods, mark every chapter in the history of human life with their unceasing efforts to increase the ratio of deaths to births, and thus keep down the race. But for their repressing influences, the statist calculates that its population would

be increased three-fold in a single century; and notwithstanding these and other obstacles to progress, man has fought them all, and regularly doubled his species in periods of one hundred years.

In the primitive world man was hale and vigorous, life was long, births were many, and deaths but few. Food was abundant and nutricious; the skies were bright, air salubrious, and all was amity, without a beast or reptile to mar the fiat of the earth's repletion. We might, therefore, take the shortest period of duplication as the ratio of progression in that early day. But as Malthus, in his treatise on the subject, has shown that as population thickens, so does food become scarce and more difficult to procure, and this serves to check its growth, a medium ratio will more accurately measure the increase of its numbers. Instead of twenty-seven or thirty years, we select fifty years as a fair period for duplication in the antediluvian world, and 1656 years, according to our accepted version, as the period of its existence between man's creation and the flood. With a doubling every fifty years, and that continued for sixteen and a half centuries, the census of the Adamland should, at the time of the deluge, number sixty-eight thousand millions, or sixty-eight times as many as that of our present earth.

This seems prodigious, yea so great, that many may suppose that the ancient world could neither support nor hold them. Yet the calculation is clearly fair, just and reasonable; and as to the capacity of the earth to satisfy themselves, they need but look at little Britain, teeming with her busy twenty-three millions; or to Egypt, a narrow valley, rejoicing with

seven millions of contented and prosperous souls. This earth too, it is manifest, has not yet begun to fill, it is but little beyond a state of emptiness. Sir Charles Lyell, to exhibit the earth's capacity, cites with approbation another's views, and adds his own as follows:

"A modern writer has estimated that there are in America upwards of four million square miles of useful soil, each capable of supporting two hundred persons; and nearly six million more, each mile capable of supporting four hundred and ninety persons. If this conjecture be true, it will follow, as that author observes, that if the natural resources of America were fully developed, it would afford sustenance to five times as great a number of inhabitants as the entire mass of human beings existing at present upon the globe. And we may safely conclude that the amount of human population, now existing, constitutes but a small proportion of that which the globe is capable of supporting, or which it is destined to sustain at no distant period." (Principles, 664.)

If America, then, can sustain a population of five thousand millions, and the Adamland exceeded in size all the continents and islands of the present terraqueous globe, we need feel no fears for the ancient people, not even that they were seriously checked in their increase by Malthus' views of food.

This estimate of the population of the primitive world, the reader will understand, is not presented as an absolute verity, but only as an approximation to the truth. Absolute precision is unattainable now, by the facts presented in this disjointed earth, but the law of contrast, that we have found and shall further find existing between the two, would indicate that the population of the former world was as dense

as this is seen to be dispersed and thin. The actaul number may have been somewhat greater or something less than our estimate; and whether the one or the other, it leads to the irresistible conclusion, that judging by the best and most reliable lights we can procure, the ancient people were vastly great in numbers, and far, very far, too many to be gathered and circumscribed in any chosen spot in Asia, and there conveniently overwhelmed by any fancied hydrostatic specialty.

Although the sacred author does not designate the number of the antediluvian people, and we may readily apprehend that no census was ever taken—he yet favors us with a statement of facts that fully corroborates and sustains the views we have presented. When men had multiplied upon the earth, their ways became offensive to their Maker; and as time rolled on sin increased, until at length the earth was filled with violence and corruption. Such is the moral picture of the ancient world; and as the impulses of the human heart have ever been the same, even from Adam's fall, so in the natural grouping of the scene is presented, as a growing feature, the constant progress of immorality. A critical examination of the statistics of all civilized countries has firmly established, that vice and crime ever keep a steady proportion to and with the density and number of the people; and so steady and uniform is that relation, that they may actually serve as measures for each other. Do we know the density and number of a nation, we also know, not only the number, but the character, of the crimes and vices that exist among them, and so, conversely, the criminal calendar affords

an index as to population. This sure law applied to the Adamland, demonstrates with certainty that teeming hosts must have crowded its broadly extended surface; and when the sacred author relates that "*the earth was filled through them by violence and corruption*," he clearly intends to convey the idea, that the *earth* was *filled* by a vicious and corrupt people, whose numbers were "as the sands of the sea, and as the stars of heaven."

The population, then, of that earth is sufficiently affirmed to have been as dense and numerous as we know this to be sadly thin and scant; and as the manifold obstructions, which in the past have thwarted this world's repletion, promise in the future no abatement of their force, we may here again discern another contrast between those ancient times and ours.

CHAPTER IX.

EDEN.

Alone I walked on the ocean strand,
A pearly shell was in my hand;
I stooped and wrote upon the sand,
My name, the year, the day;
As onward from the spot I passed,
One lingering look behind I cast;
A wave came rolling high and fast
And washed my lines away.—HANNAH GOULD

HAPPILY constituted as was the whole of the antediluvian world, yet there was one small portion of it

most felicitously endowed, some particular lineaments of which have received a more minute description. Eastward in Eden, or the land of delight, was the garden, the glory of the earth, where, without thorn or thistle, perpetually grew and ripened, as in our tropics, all those exquisite fruits which were not only good for food, but in their pleasing colors were tempting to the sight. Warm the temperature was, yet each day enjoyed its periodic zephyrs, which rendered that part "cool" and refreshing. Four rivers of this happy district united, and as one majestic stream flowed through the middle of this Elysium, to enhance its beauties and heighten its advantages.

The ancient world, with its garden, as depicted by the sacred author, presents to us in brief the plump, rotund and unfurrowed cheek of earth, adorned with a conspicuous beauty-spot upon it, which renders its recognition easy and unmistakable. These physical features, as described, were evidently intended to insure identification, *if ever found;* and to provoke a thorough search for it, this happy valley is made the hallowed spot where the divine breath first animated the dust with a living soul, and where that soul again became defiled and forfeited its first high estate.

The garden has been most diligently sought for, but not yet found. The pious pilgrim, the traveler, the geographer, and the antiquarian, have explored all the regions of the earth, hoping to find this primitive holy land; and even the daring enterprise of avarice has essayed to define its site, to gather the gold and precious stones of Havilah; but all without success. "Some," says Martindale, in his Bible Dictionary, "have thought it never had any existence,

and that whatever is related concerning it in the Bible, must be understood allegorically. Others believe it was out of the confines of this world. Others have pretended that it was only in the beginning, or before the creation of other material beings. It has been placed in the third heavens, in the orb of the moon, in the moon itself, in the middle region of the air above the earth, under the earth, in a distant place concealed from the knowledge of men, in the place now possessed by the Caspian Sea, under the arctic pole, and in the utmost southern regions. There is hardly any part of the world in which it has not been sought for—in Asia, in Africa, in Europe, in America; in Tartary, upon the banks of the Ganges, in the Indies, in China, in the island of Ceylon, in Armenia, under the equator, in Mesopotamia, in Syria, in Persia, in Babylon, in Arabia, in Palestine, in Ethiopia where the Mountains of the Moon are, near the mountains of Libanus, Antilibanus and Damascus."

Failing thus to find it, these several parties should have closely reviewed the scriptures, to ascertain whether their first impressions as to its position had been correctly formed; whether there were not other facts communicated which had escaped their biassed observation. This doing faithfully, they would have spared themselves their Herculean labors, and not have searched all other places save the one specially indicated in the record. But it should here be observed, that it is not only the garden that is lost, but also the ancient world of harmonious plains. The jewel as well as the foil, the cheek and ornate dimple, are both alike unfound and missing.

The book from which is derived all our knowledge

of those primeval times, was written by an antediluvian hand, and is undoubtedly the oldest in the world. Upon Noah, selected out of the teeming hosts of the Adamland for his righteousness, was imposed not only the duty of saving and perpetuating the human race, but of testifying to future generations, how boundless can be the loving kindness of God towards his creatures, and how intensely fierce may be his wrath when vice and crime shall provoke its action. This he did in the first ten and part of the eleventh chapter of Genesis; for this portion of scripture must be ascribed to his pen, if there be any force whatever in internal evidences. These are abundant, and equally as convincing and conclusive as if Noah's sign manual had been subscribed thereto; and evidences of the same will present themselves as we progress in our investigations.

The first truly historic personage known is Abraham, with whose lineage Moses commences his postdiluvian history, prefixing thereto, Noah's account of the olden time. These, together in company, have traveled through all the changes and chances of the rude and boisterous past, until they have reached our day, though, perhaps, not without a blur.

The older book exhibits the primitive earth as the direct antipodes to the present, and so entirely different in feature from what is generally supposed to be necessary to constitute a habitable world, that its unique characters have remained unapprehended. Men have ever read it with their own preconceived notions leading their judgment; and from the context, as it now appears, it would really seem as if, in some former day, its language had been moulded to con-

form to man's misapprehension. When the author, using the past tense to denote past time, declares: "And a river *went* out of Eden to water the garden; and from thence it *was parted* and *became* into four heads," he evidently means to assert that the rivers and the garden are to be numbered with "the things that were," and that they no longer exist. This view also accords with the after statement of their fate; and it is hardly possible that he would immediately aver that here they still are, encompassing other lands. The ellipses of the Hebrew version, accompanying the names of the rivers, have been inconsistently supplied with "is" instead of was, and the present time substituted for the past, as if they still existed. This interpretation comports well with the common belief that the present earth, as it now appears, has so stood from the very beginning. This change may have been made with very innocent intentions, as even our learned and generally accurate translators in King James's version have committed, incautiously, a gross anachronism in using the name of Ethiopia, instead of Cush, which was encompassed by the river Gihon. Ethiopia is pure and undefiled Greek, compounded of two words, signifying scorched or sunburned faces. In Moses' day the Greeks were too insignificant and powerless a people to have impressed a geographical name, in their tongue, upon any nation of the world so distant from them as Africa or Arabia, and consequently there was no land known as Ethiopia, when the Pentateuch was written. The translators, notwithstanding, convinced in their own minds that the country then known by them as Ethiopia was certainly the same as that referred to in

the original as the land of Cush, unhesitatingly made the unhappy substitution, and thereby impressed their own equivocal gloss upon the passage. In a similar way the Seventy, in the days of Ptolemy, themselves impressed with their certain identity, exchanged the Hiddekel for the Tigris, in their translation of the scriptures. Whether the views of others may not have likewise infused themselves into the verbs and tenses, is not now discernible; though from the instances furnished, it seems highly probable that these supplementary descriptions of the rivers have been, at some time before the Christian era, either wholly suffixed or modified as to time, so as to accord with prevailing notions. Sound criticism would decide that only the four names of the rivers were originally inserted by the author, and that the descriptions have been interpolated by some one, whose conceit suggested that he had really solved the knotty problem as to the site of the ancient garden; and that his interlineations were, by the Scribes, incorporated with the text in subsequent copies. Did any rivers ever bear the antique and venerable names of Pison, Gihon and Hiddekel, it is certainly remarkable, that so early as in Moses' day, they should have lost them, and thus required these retrospective allusions. Euphrates was undoubtedly honored by the sons of Noah, probably from some association, with an antediluvian name, which it has ever since retained; and this fact alone, has suggested in every age, to inquiring minds, the probable site of the garden, and induced a search for the confluent streams in its vicinity. Men have not considered that only some of the accessories of the Adamland survived the flood and took fresh root

in our modern earth, and that all need not be looked for.

Whether right or wrong in these speculations, it is universally conceded that with and without these guides the site of Eden and the garden is yet undetermined; the world that was, exists no longer. No pains have been spared, no method left untried, which could possibly illuminate the subject. Even the ancient names themselves have been subjected to the exacting powers of philology to make them reveal their origin or confess their relationship with modern tongues. But they persistently refuse to answer, and make neither confession nor revelation; for they are but "phonetic fossils," "extinct species" of the antediluvian age, and claim no affinity with the motley crowd of discordant intonations that simultaneously burst forth at Babel.

CHAPTER X.

ADAMLAND DOOMED—REMOVAL DESIGNED.

"Was happiness,
Was self-approving, God-approving joy,
In drops of dew, however pure? in gales,
However sweet? in wells, however clear?
Or groves, however thick with verdant shade?"

R. POLLOK.

IF man, here amidst the diversities in which he lives, beset with uncertainties, trials, crosses, and

disappointments on every side, with his short three score and ten, can yet discern enough of the benignity of his Maker's ways to evoke his gratitude; if he can here discover, amidst earth's complications, that

"Order is Heaven's first law,"

and proclaim that

"All discord is harmony not understood,
All partial evil universal good;"

and find all things so nicely fashioned and adjusted to promote his happiness, as to call forth his feeble praises for his Maker's goodness—what measure of adoration and devotion should not have filled the happy plains of the Adamland! There, truly, stood everywhere revealed, "Heaven's first law" in the "order" that prevailed; there was neither seeming "discord" nor "partial evil" to suggest even the poet's apologetic lines. No uncertainties or disappointments were there, to vex or mar the purposes or plans of man. Bountiful nature supplied, with little labor, all that he could need or ask. Heaven's cornucopia poured a continuous stream of blessings upon his head, and every hour of the longest life enjoyed the surest tokens of a beneficent Creator's love. Here, then, amid the grand symphony in which all minor creatures of the earth, the air and the sea participated, with exuberant feelings of joyous gratitude, and even the elements of nature themselves took part, we should expect to hear the loudest notes of cheerful praise from the bounding heart of man. Here, in "a land of wheat, and barley, and vines, and fig-trees, and pomegranates; a land of oil olive, and

honey; a land wherein they ate bread without scarceness and lacked not anything in it; a land whose stones were iron, and out of whose hills they dug the brass," we certainly should learn "that when they had eaten and were full, they did bless the Lord their God, for the good land which he had given them." (Deuteronomy viii. 8.) Not so, however; for alas! poor, yet proud, dependent, yet self-confident, the puny creature proved unworthy of his Maker's love: his inestimable blessings were too elevated for his fallen nature. "He said in his heart, my power and the might of mine hand hath gotten me this wealth;" and "his heart was lifted up so that he forgot the Lord his God, and remembered and kept not his commandments, his judgments and his statutes, as he had commanded him." Their sins were as Sodom, their transgressions heavy upon the earth.

Thus was it in the Adamland, after men had greatly multiplied upon it. Hitherto they had never encountered the fierce and fiery wrath of God, nor even tasted of His displeasure. Smiles, not frowns, invoked them to obedience, and the chastising hand was to them unknown. Melancholy is the reflection that an eventful change was necessary—that it was deserved, ordained, and fulfilled. To them the solemn fiat of destruction came, but only as an empty sound was it received, unheeded and contemned.

It was in the year 1536 from man's creation, about the last of April, that the woful decree was pronounced by Him, whose inviolate word ever serves to make his just judgments a "light for the people." Then said the Lord, "My spirit shall not always

strive with man, for that he also is flesh: Yet his days shall be an hundred and twenty years."

More than a century later, when the human race had quadrupled again in numbers, after Shem, Ham and Japhet were born, grown to man's estate, and taken to themselves wives; God looked upon the earth, and behold it was corrupt, for all flesh had corrupted his way upon the earth. And God said to Noah, who, as a just man, and perfect in his generations, had found grace in his eyes:

"The end of all flesh is come before me; for the earth is filled with violence through them; and behold *I will destroy them with the earth.*

Make thee an ark of gopher-wood; rooms shalt thou make in the ark, and shalt pitch it within and without with pitch.

And this is the fashion which thou shalt make it of. The length of the ark shall be three hundred cubits, the breadth of it fifty cubits, and the height of it thirty cubits.

A window shalt thou make to the ark, and in a cubit shalt thou finish it above, and the door of the ark shalt thou set in the side thereof; with lower, second and third stories shalt thou make it.

And behold I, even I, do bring a flood of waters upon the earth, to destroy all flesh wherein is the breath of life, from under heaven; and everything that is in the earth shall die.

But with thee will I establish my covenant; and thou shalt come into the ark, thou and thy sons and thy wife and thy son's wives with thee.

And of every living thing of all flesh, two of every sort shalt thou bring into the ark, to keep them alive with thee; they shall be male and female.

Of fowls after their kind, and of cattle after their kind, and of every creeping thing of the earth after his kind, two of every sort shall come unto thee, to keep them alive.

And take thou unto thee of all food that is eaten; and thou shalt gather it to thee, and it shall be for food for thee and for them. Thus did Noah; according to all that God commanded him, so did he."

These directions, so few and general in their character, imposed upon Noah the greatest responsibility that ever rested upon the shoulders of man. Their execution, most assuredly, was attended with constantly occurring doubts and difficulties, and the varied details, without express instructions, must have demanded the most energetic exercise of the soundest judgment. Yet Noah was selected by the Almighty, and to him was entrusted the weighty task of making all the needful preparations and arrangements for a change of worlds. That he was fully competent to discharge the duty, and that he did discharge it well and thoroughly, the fact itself affirms as positively as the page of scripture.

No portion of the sacred writings has been so fiercely assailed by a certain class of philosophers, as this in relation to the flood. So vigorously have they plied their shafts of malice, their ridicule and sneers, and so ingeniously have they suggested difficulties as to the possibility of the Mosaic deluge, that even learned bishops and lesser lights in the church have been driven or seduced from their propriety, and condescended to compromise the matter with conscience, by believing only a part of what scripture plainly and positively affirms. By way of elixir, however, theories and hypotheses have been devised as substitutes for the original version, which the authors have presented and recommended as savoring less of superstition, and requiring less strain

upon credulity for acceptance with an enlightened and liberal minded world.

The chief difficulty to the belief of an universal flood, and the one most persistently and successfully urged, is the insufficiency of water for any such purpose. Mr. Jefferson treats the subject in a scientific way, and forcibly illustrates the impossibility of such an occurrence. In his notes on Virginia, he philosophises as follows:

"The atmosphere and all its contents, whether of water, air, or other matters, gravitates to the earth; that is to say, they have weight. Experience tells us that the weight of all these together never exceeds that of a column of mercury thirty-one inches high, which is equal to one of rain water thirty-five feet high. If the whole contents of the atmosphere, then, were water instead of what they are, it would cover the globe but thirty-five feet deep; but as these waters as they fell would run into the sea, the superficial measure of which is to that of the dry parts of the globe as two to one, the seas would be raised only fifty-two and one half feet above their present level, and of course would overflow the lands to that height only. In Virginia this would be a very small proportion even of the champaign country. Deluges beyond this extent, then, as for instance, to the North Mountain or to Kentucky, seem out of the laws of nature."

Thus does the American philosopher of the French school of sceptics, state the difficulty in a mathematical way, and in as strong a light as it can be presented. Yet with that inconsistency, ever manifest in the philosophy of the unbelieving school, whilst proving an insufficiency to reach to Monticello—he yet demonstrates the existence of enough—fifty-two and one half feet—to reach to more than twice the height that Moses avers it did in the days of Noah.

This want of water is certainly a very great drawback to a universal deluge, but what "can t be cured must be endured." So thought another modern philosopher, who has recently presented to mankind his "World before the Deluge," handsomely illustrated with engravings. From his interesting description of the animals of that primitive period, we learn that for fierceness, blood-thirstiness and carnivorous propensities, this postdiluvian world can furnish but very feeble similitudes. He assures us of several deluges, the memorials of which are still plain and manifest; and of the Mosaic gives a glowing and graphic account. Some fancied portion of Asia is the scene of the world's discomfiture; but how the weak and defenceless races were restrained within the narrow limits, in close proximity to their vigorous and carnivorous enemies, until destroyed, is wholly unexplained. For want of water the author is driven to the necessity of using a copious supply of mud. By some unaccountable means he gets within a circumscribed area, "bounded by the visible horizon," all the carnivorous and herbivorous races, man, beast, bird and reptile; and then, instead of calling torrents of rain from clouds half a mile in height, he simply taps the mountain tops, five miles in height, and thence procures such a plenitude of mud and water as effectually accomplishes the object of destruction. This is intended for the flood mentioned in Genesis, and there described as universal: and the author, by the aid of a Hebrew grammar, feels justified in affirming, that "all the mountains," clearly and simply means only the mountains visible from some given point, bounded by the horizon. So, too,

from another writer on philology, he learns that "all the earth" does not mean all the earth at all, but only a region populated. Thus far he seems happy in his authorities, but at last he fails; for, notwithstanding his industrious researches, he is unable to cite a single author to establish that an universal flood of water can only mean a partial flood of mud. In this novel account we have Noah's deluge beautifully represented, with Noah, his ark and deluge all left out; and that too, by one who frankly acknowledges that it is to sacred history alone he is indebted for the few particulars he knows concerning it.

Other writers have acccomplished the same feat, actually with water, first calling upon philology and Hebrew grammars, to curtail the earth to suitable dimensions for diluvial destruction. True, these theories do not assure us that this rule of construction applies only to the earth and its mountains, and not equally to the phrases "*all* the men, *all* the beasts, and *all* the fowls of the air," and thereby subjects us to doubts and difficulties for individual solution; yet they furnish much comfort in the consideration, that the same philology and Hebrew grammar must be also accepted to explain the last great flood of fire, by which all the earth and all the mountains and men and beasts are to be consumed; which by the authorities and parity of reasoning can only mean some limited regions of the earth, and only so many of the mountains as shall be within the range of somebody's horizon. This is certainly a source of much consolation, and makes ample amends for all the doubts and difficulties remaining unexplained by these hypotheses. Some men, even those called

learned, even great philosophers, may thus strain at gnats and yet swallow camels.

Noah's flood really contains no such difficulties as are fancied, and requires no such ingenious substitutes for its solution. The Mosaic account, when properly understood, is extremely simple and intelligible; and far more credible than these fond conceits, merely devised to adapt the word of God to meet the views of scoffing sceptics. Had Mr. Jefferson and his confreres been only half disposed to know the truth; had he searched the sacred history with half the zeal he did the Mecklenburg Declaration, he would have discovered that when Moses penned the fact that fifteen cubits of water covered all the earth and all its mountains, he was then sitting beneath Sinai's shadow, or perhaps upon its summit, 7,300 feet above the ocean; and that he knew as well as Mr. Jefferson, that water raised to the height of fifteen cubits could not reach to Monticello, much less to Sinai's summit, and yet he wrote the sacred page. Discovering this, Mr. Jefferson would have further searched and found again a splendid paradox worthy of his philosophical study: that the ark floated upon fifteen cubits of water, but when the flood subsided it rested upon Ararat, a mountain three miles high. The solution of this problem would have unfolded the truth in its clearest light, and answered his barometrical difficulties. Yea, without such study, a careful reading of Genesis would have taught him that Moses makes no reference whatever to the Blue Ridge, Sinai, or other mountains of the present time, but expressly and explicitly affirms that the *ancient earth*, with all *its* mountains, men, beasts, fowls, and creeping

things was utterly destroyed, save Noah and his charge. From a declaration so lucid and intelligible, it is patent that the scriptural terms can only apply to the earth as it formerly was, and not as it is at present; and any application of modern measures to ancient things, is not only simple but ridiculous. With as much reason might they insist upon cutting a coat for Lilliput by Gulliver's pattern; and by their unnatural commingling of incongruities they remind us of the Flemish artist, who painted the patriarch Abraham in the act of sacrificing his son Isaac, with a modern Dutch blunderbuss pointed at his head; and of another painter who represented the Virgin Mary as seated in a handsome rocking chair, surrounded with a copious wardrobe of silks and satins, with her table spread and adorned with a gorgeous set of silver ware, including the modern sugar dish and coffee pot; and of another of the French school, who, when instructed by Louis to erase a handsome painting of Napoleon and his marshals, wishing to preserve the work of art, merely retouched and converted it into a picture of Christ and his Apostles, but inadvertently sparing the boots, presented the man of peace and his pacific staff, arrayed in the huge military habiliments of the Napoleonic age. These anachronisms, betraying a want of knowledge or consideration, only excite a smile, and yet they represent the truth as accurately as the sceptic who depicts the ancient world in modern dress, and then ascribes the scene to Moses as the artist.

Passing by these local deluges of mud and water, we shall proceed to the investigation of Noah's flood, and endeavor to present it in all its simple truth, but

only as it is described in scripture. Seen in this light, no philology or Hebrew grammar can improve its features, nor can any other hypothesis displace it. Upon full consideration, it will be found to be the best authenticated fact ever presented to the mind of man. The form of the present earth, its seas, continents and islands, their shape and heights; the mountains high and low, whether capped with snow or flame; the elevated steppes and humble plains; the deserts, lakes and rivers; and every square mile of surface, with one united voice, attest the truth of scripture, as to *Noah's universal* flood.

At the very threshold of inquiry, we are opposed by sundry objectors who would preclude all investigation whatever as unnecessary and foolish. It behooves us, therefore, in a preliminary discussion, to consider the difficulties that have been presented, and, if possible, remove the obstacles in the path of a sound and reasonable faith, and this chapter will be devoted to such a purpose.

First, it is dogmatically affirmed that the species of animals are so extremely numerous, that the capacity of the ark was wholly inadequate to contain and transport them, with their necessary food, as detailed in scripture. If this be so, the sacred history, as a book of truth, is at once flatly condemned and unworthy of further investigation. A little labor and patience is all that is requisite to give to this dogma a perfect and perpetual quietus.

In all former ages, as standards of lineal measure, certain members of the human body were adopted. The "cubit," a favorite with all peoples, has ever

been used, as designating the average length of the forearm, from the elbow to the tip of the middle finger. This, in later days, has been fixed at 18 inches, corresponding with the present dimensions of the human race. Those who have studied deeply the hidden things of antiquity, affirm that there was, in very ancient times, a larger cubit measuring 21.8 inches. From scripture, we deduce that formerly there were known two cubits of different sizes. Moses, when speaking of the giant Og, gives us the dimensions of his bedstead, and cautiously adds, that he states them "after the cubit of a man." This language implies that there really was another and different cubit, about which a mistake might be made; and the inference is clear, that, as he was speaking of a giant, he was apprehensive that the reader might conceive a giant's cubit was meant, and he therefore carefully appends the qualification, to prevent misconception. When speaking of the ark, the term "cubit" is used, but without any qualifying phrase; and, as it was written with reference to giant times and giant beings, it may well be insisted that the giant's cubit—twice the size of ours—was evidently intended. This is the more reasonable, when it is remembered, that for Tubal-Cain's smithery we must conceive a larger hammer was required and used, than in similar establishments in our day. The organ and the harp of the present times would be too diminutive for the sons of ancient Jubal; and so too, as in all other matters, should the dimensions of their dwellings exceed greatly in size those with which we are acquainted. It might then, compatibly with reason and all the rules of construction, be assumed that

the antediluvian cubit is the one referred to in the stated dimensions of the ark.

However, to avoid all cavil, and to extend to our opponents the most liberal view of which the case admits, we shall refrain from using either of the larger cubits, and conform our estimates only to that of 18 inches, which is a known and recognized measure of the present day.

By this standard, we ascertain that—

The length of the ark	was	450	feet,
Its breadth	"	75	"
Its height	"	45	"

These dimensions, as well as the other details of the ark, are worthy of our consideration, as they suggest other views of an interesting character. It is certainly remarkable, that in the antediluvian period these relations of length to breadth, six to one, should have existed, and accord so well with the rules of modern naval architecture; such being a common proportion of ships in this our commercial day. The readiness with which Noah comprehended the few, brief and simple specifications given to him, the promptness with which he undertook the work, and the facility of its execution, all strongly indicate that the meaning of the term "ark" was well understood, and that other arks had been previously built in the Adamland. The magnitude and peculiar character of the work, differing so greatly from common edifices, necessarily implies the coöperation of many hands, practiced and familiar with this particular kind of structure. The term ark may really have been the name of the ship in the ancient world, and it may

well be doubted whether our idea of the shape and form, as a simple parallelopipedon, is not wholly fallacious.

It should also be observed that its height, 45 feet, is to be divided into three stories, which would allow for each a pitch of fifteen feet. Why so high, unless for giant men and animals? At the present day, and for the existing races, such an altitude would be wholly unnecessary, and would be condemned as unreasonable, especially in structures intended for the sea. For our camel and giraffe the height of fifteen feet might be necessary, but a single story or a small apartment of extra height would have been sufficient for them; all the others would have been amply accommodated with lower stories. But Noah and his family were required to pass up and down, and throughout the ark, and for their convenience, this, to us, extraordinary altitude, was absolutely essential. This fact, thus incidentally disclosed, furnishes circumstantial testimony of the clearest kind that there were giants in the earth in those days, and that they were also in the ark itself.

That the domestic economy of our mammoth ship was conducted in a rational and systematic manner, is communicated in the fact that the ark was divided, not only into stories but into rooms, stalls, apartments and divisions. We may conceive, then, that the animals were thus classified and arranged according to size, habits and character of food; that the large and small were separate, those of a kindred race being near each other, and the food of all so disposed as to admit of the easiest distribution. As the pitching of the ark within could in nowise prevent exter-

nal leakage, its manifest object was the transportation of water, as well in the bottom of the hold as in suitable tanks, to supply not only drink to all, but a sufficiency for those whose habits and natures required its constant use. A thorough examination of the specifications furnished, discloses that in and about the ark all things were done "decently and in order."

In the array of figures, accompanying the description of the flood, many interesting facts of the last importance are communicated; and this much neglected portion of scripture is certainly deserving of our gravest study. When we are informed that the ark did not float nor leave her stocks until the water rose to the height of fifteen cubits, we are at once apprised of her immense tonnage, and that, too, with such precision that it may be estimated to a single pound. The total weight of ark and load was exactly equal to the weight of as much sea water as it displaced; and, as it sank to one half its depth, the quantity displaced would equal one half its own dimensions. The length and breadth, and one half the height, multiplied into each other, gives us 759,375 cubic feet as the quantity; and as average sea water weighs 1,026 ounces per cubic foot, we ascertain that the ark and its load together weighed 22,785 tons, of 2,000 pounds each. The gopher wood, an antediluvian name, now beyond research, was probably cypress, long-leaved pine, or the cedar of Lebanon—all growing abundantly in the regions around Ararat, and of which Alexander the Great built his navies, as eminently suitable for such a purpose. To build the ark, with its several stories, rooms and roof, would

require at least 300,000 cubits of timber; and, if of the kind above mentioned, its weight would be 45 pounds per cubic foot. Thus we ascertain that the ark itself would weigh 6,750 tons, and leave for the load it bore 16,035 tons.

It is only since the days of Linnæus—who was born in the year 1707—that the sciences of Botany and Natural History have been, with great zeal and industry, pursued in a systematic way. During this brief period the naturalist has labored to acquire a knowledge of all the races of beings that inhabit the different portions of the globe; and, in making his catalogues, as numbers thickened, and presented both resemblances and diversities, great and small, to facilitate his studies he classified them into orders, genera and species. Elated with his attainments, whilst confounded by endless differences, and animated with that measure of self-confidence that is common to us all, he already presumes to know, not only how they are at present, but how their predecessors were for thousands of years before them. He does not hesitate to affirm, that by the term *species*, we must understand races of animals, that from the creation have preserved certain peculiar characteristics, which, under all circumstances, have ever remained constant and undeviating. These marks and features he holds to be so plainly unalterable as to justify him in the dogmatic assertion of their perpetuity; and he is unable to believe that original types have ever undergone any material modification, either by addition, subtraction, or otherwise. It is to this class of philosophers—for all do not join in this opinion—that we are indebted for the

very extended list of species, too numerous, as some suppose, for the capacity of the ark. As a general view of a great array of numbers commonly tends to overawe the mind, hush inquiry and lead to false conclusions, it is desirable that we should examine the subject with more particularity, in order that we may truly ascertain the merit of the objections.

In general terms we are told that "the number of vertebrate animals may be estimated at 20,000.

"About 1,500 species of mammals are pretty precisely known, and the number may probably be carried to about 2,000.

"The number of birds well known is 4,000 to 5,000 species, and the probable number is 6,000.

"The reptiles number about the same as the mammals—1,500 described species, and they will probably reach the number of 2,000."

They further suggest that the number of fossil and extinct species will equal those now living.

This statement presents a very formidable list for Noah's ark; 10,000 living and as many extinct species, all knocking for admission. But mighty as is the array, we should not stand appalled. As the naturalist, however, fails to tell us when the fossil species became extinct, whether before or since the flood; and as they were of the same races of animals as those now existing, and evidently lived in a different age, and were probably their progenitors, we shall not be guilty of the anachromatic folly of placing, side by side, widely distant generations of the same beings. We shall pass by for the present the ancient dead, and only consider the living.

We produce to the reader a list of the existing

species of animals taken from Professor Johnston's Physical Atlas, a work of high repute with men of science. Opposite to each we have placed the average weights of the whole class; some of them derived from works on Natural History; some from Jefferson's notes on Virginia; some from actual experiment, and others by comparative estimates. The average weights of those grouped together, have been ascertained by separately estimating each particular species. In the antelope family, for instance, there are some as large as the horse and others as small as the lamb; each grade has been appraised, and the sum total divided by the number of species. Although strict accuracy may not be attained, and it should not be expected, yet it will be found sufficiently so for a satisfactory solution of our problem.

We also add an estimate of the amount of food that will be requisite for all the animals; and that not only for the voyage, but for a much longer period, as we are admonished that the earth itself and all things on it are to perish. We may, out of abundant caution, provide a year and a half's supply without apprehension as to its becoming spoiled; for food that matures in such a climate as that of Adamland, when dried would keep for many years, yea, as long as grain in Egypt in Pharaoh's day. An active man of 150 pounds weight consumes, in the course of the year, more than twenty times his own weight, including wine, coffee, tea, and atmospheric air. But omitting luxuries, he requires two pounds of solid food, and four pints or pounds of water per day, making for the year 2281 pounds, or fifteen times his actual weight. The army ration for a large horse is four-

teen pounds of hay, and twelve of oats, corn or barley, with four gallons of water, which is equal to twenty times his weight; but he when not actively laboring can live on fifteen times his weight as well as man. This proportion will no doubt be amply sufficient for any and every animal, as men and horses from their lung development and rapid and extended circulation of blood, require an amount of food, if not greater, fully as great as any other. To prevent all idea of stint or starvation, we shall, however, estimate thirty times the weight of the animals as an amount necessary to include their food and drink for eighteen months. To this no objection can be urged.

A LIST OF THE SPECIES OF ANIMALS GENERALLY SUPPOSED TO HAVE BEEN TAKEN INTO THE ARK BY NOAH, WITH THE AVERAGE WEIGHTS OF EACH.

MAMMALIA.	No. of Species.	Average Weight.	A single one of all the species.
ORDER—QUADRUMANA.			
Tailed Monkeys, Old World.....	72		
Tailless do. "	7		
Sapajous, New World.....	43		
Sajouins, "	48		
Prosimiæ,.....	32		
Pounds,	202	25	5,050

MAMMALIA.			No. of Species.	Average Weight.	A single one of all the species.
ORDER—MARSUPIALA.					
Opossums,	New World.	Pounds.	21	5	105
Dasyuridæ,	Old World.....		13	20	260
Myrmecobius,	"		2	10	20
Peramelidæ,	"		8	18	144
Kangaroos,	"	Various sizes.....	40	4	160
Hypsiprimus,	"		10	4	40
Phalangistidæ,	"		26	15	390
Wombats,	"		1	2	2
Dendrolagus,	"		2	¼	½
					1,121

ORDER—EDENTATA.				
Bradypus—3 fingers—Sloth.	New World.....	2	27¼	54
do. 2 " A. I.	"	2	13	26
Armadillo,	"	11	8	88
Pichiciago,	"	1	1	1
American Ant-eater,	"	4	3	12
African do.	Old World.....	1	3	3
Pangolin,	"	4	3	12
Porcupine Ant-eater, ...		2	10	20
Ornithoryncus, ...		1	10	10
				226

ORDER—PACHYDERMATA (Thick skinned).			
Elephant, ...	2	10,000	20,000
Hippopotamus, ...	1	6,000	6,000
Rhinoceros, ...	7	5,000	35,000
Damans, ...	3	5	15
Swine (Common), ...	9	250	2,250
Wart hogs, ...	3	50	150
Peccaries, ...	2	46	92
Tapirs, ...	2	534	1,068
Horse, including Zebra, Ass, &c., ...	9	750	6,750
			71,325

CARNIVOROUS RACES.	No of Species.	Average Weight.	A single one of all the species.
ORDER.—CHIROPTERA (Hand-winged).			
Bats living on fruits,	39	8	312
Bats " insects,	141	½	70
Vaulting or flying Cats,	5	4	20
			402
ORDER—INSECTIVORA.			
Hedgehogs,.....Ounces.	5	34	11
Shrews,	26	34	55
Banxrings,	4	34	8
Hylomys,	1	34	2
Oriental hedgehogs,	1	32	2
Desmans,	2	4	½
Scalopes,	1	4	¼
Cape Elephant Shrews,	5	1	¼
Chrysochloris,	4	4	1
Tenrecs,	4	4	1
Moles,	4	4	1
do. Star-nosed,	4	4	1
			83
ORDER—PLANTIGRADA.			
Bears,.....Pounds.	12	300	3,600
Raccoons,	2	16	32
Pandas,	1	4	4
Coatis,	6	4	24
Benturongs,	4	4	16
Kinkajous,	2	4	8
Badgers,	2	13½	27
Gluttons,	5	30	150
			3,861
ORDER—DIGITIGRADA.			
Martens,	28	4	112
Stinkards,	2	4	8
Skunks,	15	4	60
Otters,	17	12	204
Dogs (Common, Hyena dog, Wolf, Fox, Jackal, &c., Otocyon)	41	30	1,230
Civets,	15	3	45
Cryptoproctas,	1	2	2

(Carried forward.)

ORDER—DIGITIGRADA—(continued.)	No. of Species.	Average Weight.	A single one of all the species.
Patamophiles,	1	2	2
Linsangs,	1	3	3
Paradoxures,	4	8	32
Ichneumons,	10	4	40
Suricates,	2	3	6
Proteles,	1	14	14
Cynictis,	1	3	3
Bassaris,	1	4	4
Hyæna,	4	75	300
Cats, including	51		
Lions,	3	600	1,800
Tigers,	1	300	300
Leopards,	1	120	120
Panther, Old World	1	120	120
Ounce,	1	120	120
Jaguar,	1	218	218
Cougar,	1	100	100
Other Cats,	42	45	1,890
			6,733

All land carnivora, 514 species.

ORDER—RODENTIA. (Gnawing Animals.)				
Squirrel tribe, Old World,	169	94	2½	
" " New "		75	2½	422
Mouse tribe, Old World,	309	195	¼	
" " New "		114	¼	77
Hedgehog tribe, Old World,	83	6	2¼	
" " New "		77	2¼	187
Hare tribe, Old World,	46	30	6	
" " New "		16	6	276
				962

ORDER—RUMINANTIA. (Ruminating, or cud-chewers.)			
Camels,	2	1,700	3,400
Llamas,	3	200	600
Musk deer,	7	90	630
Deer,	41	120	4,920
Giraffes,	2	1,000	2,000
Antelopes, includes Gazelles,	48	125	5,900
Goats,	14	80	1,120
Sheep,	21	80	1,680
Oxen,	13	900	11,700
			31,950

BIRDS are classified, by some naturalists, into five orders, as follows:

	No. of Species.	Average Weight.	A single one of all the species
ORDER—Rapaces, Birds of Prey—includes, as families falcons proper, hawks, eagles, vultures and owls. A large eagle weighs from 15 to 18 pounds. The osprey, a powerful bird, 5 pounds.	295	8 lbs.	2,360
ORDER—Scansores, or Climbers, consists of four families—cuckoos, woodpeckers, parrots, and toucans.	416	12 ozs.	312
ORDER—Oscines (Songsters.) In this system of classification many incongruous races are grouped together. The perching birds, as goat-suckers, swallows, motmots, todies; trogons, puff-birds, kingfishers, jacamans and bee-eaters, rifle-birds; plumed birds, hoopoes, guit-guits; saw birds, humming birds, honey-eaters, oven birds, creepers, nuthatches and wrens, shrikes, manakins, drongo shrikes, caterpillar-eaters, fruit crows; umbrella bird, chatterers and cotingas. Fly-catchers, becards; tyrant fly-catchers, cocktails; bulbuls, orioles, babblers, tree-thrushes, ant-thrushes, and owzels. Warblers, wag-tails, pipits or tit-larks, bush-creepers, tit-mice, robins, wheat-ears, redbreasts, shamas; Indian robin and bluebird; true warblers, nightingales, tailor birds. Weaver birds, grosbeaks, tanagers, sparrows, linnets, finches, bunting-larks, bull-finches, crossbills and plantcutters. Glossy starling, or bower birds, grackles, ox-peckers, true starlings; meadow larks; blackbirds; Baltimore oriole, orchard oriole; redwinged oriole, cowbird and boblink. Hornbills, plantain cutters, colies.	1,364	4 "	312

ORDER—BIRDS—(continued.)	No. of Species.	Average Weight.	A single one of all the species
Piping crows, jays, tree crows, true crows, ravens, rooks, jackdaws; magpies, choughs, birds of Paradise.			
ORDER—Gallinacæ (Scratchers or Scrapers). Grouse, partridge, quail, pheasants, common fowl, turkey, peacock, curassou; pigeons and doves.	304	5	1,520
ORDER—Grallatores (Waders). Rails, jacanas, Snipes, phalaropes; sandpipers, curlews, ruffs, tatlers, stilts, avocets, spoonbills, ibises, storks, cranes, herons, bitterns; boat-bills, plovers, oyster catchers, thick knees, bustards, trumpeters.	488	2	976
Ostriches, emeu cassowary,.....	3	500	1,500
ORDER—Natatores (Swimmers). Flamingoes, swans, geese, ducks, grebes, divers, guillemots, loons, tern; penguins, auks, puffins, pelicans, cormorants, frigate-birds, gannets, darters, tropic-birds; gulls, albatross, fulmans and petrels.	458	10	4,580
Large swan,... weighs 30 lbs. Common goose, " 7 to 10 " Brant,..... " 4 " Mallard,..... " 2½ " Large coot,.... " 1½ "			

The REPTILES are classed into four orders :

ORDER—TORTOISES.			
1. Land tortoises.....	15	10	150
2. Fresh water, marsh and river.....	46	10	460
			610

Order—Reptiles—(continued.)	No. of Species.	Average Weight.	A single one of all the species.
Order—Saurians—Lizards.			
Crocodiles,	13	500	6,500
Chameleons,	7	¼	2
Geckos,	27	⅛	4
Iguanas,	55	½	27
Varans, monitors, etc.,	15	4	60
Teguexins,	11	6	66
True lizards,	20	⅛	3
Chalcis, etc.,	16	⅛	2
Skinks,	39	1/18	2
			6,666
Order—Ophidia—Serpents. Of these the venomous are to the innocuous as 1 to 4.	265	2	530
Order Amphibia—Frogs. Consisting of cæcilias, true frogs tritons and newts, amphiuma, proteus, etc.	120	¼	30

Our tables present us, then, with the following aggregates:

	Pounds.	Pounds.
Quadrumana, by pairs	5,050	10,100
Marsupiala, "	1,121	2,242
Edentata, "	226	452
Pachydermata, "	71,325	142,650
Bats, "	402	804
Insectivora, "	83	166
Plantigrada, "	3,861	7,722
Digitigrada, "	6,733	13,466
Ruminantia, by 7 pairs	31,950	447,300
Birds, " "	11,589	162,246
Tortoises, by pairs	610	1,220

TABLES—(continued.)	Pounds.	Pounds.
Saurians, by pairs,.....	6,666	13,332
Serpents, "	530	1,060
Frogs, "	30	60
Total weight as estimated,.....		804,744
To which we may add for insects,.....		1,000
For Noah and family,.....		2,000

Whole weight of living beings, equivalent to 404 tons, nearly.
Food and drink, — 12,120 "
Extra water for Aquatic races — 2,109. Total tons..... 14,633
Which would cover the floor of the ark to depth of 2 feet;
Leaving still to spare of the 16,035 tons before computed,..... 1,402 tons unoccupied.

This special discussion of the subject fully discloses that the capacity of the ark was greatly more than sufficient, not only for the multitudinous species already known and numbered, but for also those that are promised in the future. Under no circumstances is it possible for the aggregate weights to exceed 500 tons; and their food and drink 10,000 more; a sufficiency for one year being all that was truly and actually required, and such amount would not reach to the tonnage of the ark. We trust therefore, that this objection may be deemed as fully and satisfactorily disposed of.

But other obstacles are again propounded to the salvation of the races by the arkite method. True, they are of a trivial kind and scarcely deserve attention, and yet they are sufficient to prove the captious spirit of the objectors. The details as to the construction of the ark and its loading are few and sim-

ple, but fully sufficient for sound, impartial minds not over curious or querulous; and the sacred writer well knew, that in every age there would exist a class of beings whom no amount of specification would satisfy, and he therefore limits his description to the bounds of equitable reason.

The objections referred to are difficulties as to cleansing and ventilating the ark. The first, as to cleansing, could be so easily provided in the fashion and construction of the ark, and would so naturally suggest itself to even simpler men than Noah, that it is passing strange that *philosophers* of the present day should have thought of, much less ventured to present it to the world as a serious difficulty.

The roof of the ark was light, and was easily removed by Noah when on Ararat, and it was no doubt arranged so as to exclude rain, yet permit the ingress and regress of air, and thus secure ventilation. When our adversaries suggest this trouble, they seem forgetful of our two and three decked ships which have been long and successfully used, though liable to the same objection; and they also overlook the fact that in our cities many stories of buildings descend far below the surface of the ground. It is true that within the last few years, certain patent ventilators and blowers have been introduced into some of our ships for the purpose of exciting currents of air, and they answer very well. But the ark was not behind in this respect, for the flapping of 168,000 wings and 9,000 mammalian ears, with the whisking of 4,000 tails, would evoke such a storm for ventilation as would overwhelm our modern patent blowers with shame.

Having, then, considered the formidable objections that scepticism has urged to the scriptural account of the flood, and found the same untenable; we can the more freely say to the reader that no such menagerie was ever placed under the charge of Noah, and there is no such thing as species, in the sense alleged by these philosophers; that "each *species*," as it now appears, was so created in the beginning; and that a rat with a tail four inches long is just as specifically different from one whose tail is five inches, as a bear is different from a beetle; that there were originally created more than three hundred species of little humming birds; each made for, adapted to, and placed in the different latitudes between Hudson's Bay and Cape Horn, where they have remained and increased in their respective habitats throughout all past time, without a material change of form or feather; so, too, with three hundred species of rats and mice, we are required to believe that the differences existing, at present under their varied conditions of life were at first imparted to their primitive ancestors, and have continued permanent with their descendants until our day.

To assign the individuals to their proper places in the mode of classification adopted, often times the closest scrutiny is requisite to ascertain the species. Some are known only by their teeth; some by their claws and nails; some by the color of the fur that grows beneath the hair; and some by the length of their tails. Peculiarities are often so slight that they can only be discerned by aid of the microscope, whilst others can only be known upon dissection. The hair of some must be examined closely, to learn

whether it be rough or smooth, round, oval or flat; and a little instrument, the trichometer, is used to test the elastic and frangible qualities of hair, and determine how much it will stretch with a given number of pennyweights or grains, and how many more it will bear before it breaks.

The patriarch Noah, thus engaged, must have been intensely occupied with these ten or twenty thousand vertebrates. He must have presented an interesting spectacle to his fellow-beings, traversing the Adam-land, with his box of instruments, catching the Edentata, and forcing open their jaws to see if they were toothless; counting the incisors, canines, and molars of others; catching all the rats and mice,—to secure 300 species,—rubbing back their hair to know the color of their fur, and measuring their tails with his pocket rule; inspecting hairs with his microscope, and testing their frangibility with his trichometer and grain weights—and, finally, slaughtering and anatomizing races, to know whether they were a distinct species from those already secured and assigned to the ark. Truly, 120 years was too short a time for a single man to accomplish such a task, especially as a host of naturalists have been busily engaged for 160 years in the same pursuit, and tell us there are yet probably 500 mammalia, and 1,000 birds, to be found and added to the lists. Adam gave names to all the animals in the primitive world, before he became a married man.

Another class of naturalists, with more reason on their side, guided not only by the laws of physiology, but by actual, daily, and long continued observation, insists that these many species are but multiplied

varieties of a few original types, induced by food and climate. The conditions of life, in this our irregular and diversified world, are as various as the species; and it is really marvellous, that individuals are enabled to retain a sufficiency of their original type to be identified as a species of a particular genus.

Before the flood, there were no such diversities of climate, food, and condition as have existed since. Animals were not carnivorous; they did not chase and pursue each other; they lived in peace and plenty, and did not put on the varied forms they now present, but closely conformed to their created types. The races, though greatly fewer as to species, were much larger and more uniform in character. Instead of 1,500 species of mammalia and 6,000 of birds, it is barely possible that one-tenth of those numbers were received into the ark. As *one-twentieth* part of all the *winged species* consists of humming birds alone, and *one-fifth* of all the mammalia species consists of our ubiquitous rats and mice, it may readily be comprehended, how much the modern catalogue would be reduced, if confined to the original primitive types.

To ascertain at the present day, which of the existing genera, if any, retain the first and ancient form, is absolutely impossible; that none possess the antediluvian size may be deemed as certain. In accordance with this view, the geologist finds in all the continents the fossil remains of extinct species of animals. These were so gigantic in their dimensions, that he dignifies the period in which they lived as the "reign of mammals." Although so large in their proportions, they varied so little from the present

races, that the same names have been conferred upon them—elephants or mammoths, the rhinoceros, and hippopotamus, the tapir, hyæna, stag, bear, wolf, hare, dog, cat, rat, bat, and mouse are recognized without the slightest difficulty. These giant races, we hold, came over with Noah and his giant sons, and spreading over the earth, subjected to ever variant conditions, have all alike degenerated, and undergone manifold mutations of form and character. For them and their accommodation was the ark constructed and loaded; but exactly how, may be beyond our reach. Yet, as the world is tenanted and replete with beings whose ancestors escaped the destroying surges of the flood, we may rest assured that the arrangements of that day were fully adequate to the eventful crisis.

The portion of the Sacred History we are at present considering, presents to our view an ancient patriarch, busily engaged for a series of years in fulfilling his Maker's directions, to escape the sure destruction that has been denounced against a sinning world. He has only heard the fiat of his God, and has never experienced the fierceness of His wrath, or the certainty of His judgments. Yet resting upon that word alone, in the midst of a crowded and joyous people, daily taunted with the scoffs and jeers of all around him, and constantly mocked at for his simplicity and folly, he persistently devotes his energies to secure his future safety. He builds an ark of huge dimensions; his laborers are employed throughout the Adamland gathering the beasts, birds, and reptiles together, with tons of suitable food for their subsistence; yea, he is even deserting his com-

fortable house and home, transferring to his ark his goods and chattels, his mechanical and agricultural implements, his tents, and all other articles that may possibly be useful in a new and unknown home, that is slumbering beneath the sea. All this he is doing, whilst thousands of millions of disbelieving souls around him are feasting and dancing, marrying and giving in marriage, he being supported throughout his trials by the steady and sustaining Hope, that in the end he will surely reap the ripened fruits of Faith.

CHAPTER XI.

THE FLOOD.

But tell me! tell me! speak again,
Thy soft response renewing—
What makes that ship drive on so fast?
What is the ocean doing?—COLERIDGE.

IN this chapter we proceed to the solution of the paradox referred to in the last; that the ark is described at first as floating upon waters, which stood upon the earth to the depth of only fifteen cubits, and at last, upon a subsidence of the flood, as resting upon a mountain three miles high. The investigation of this problem brings to view one of those feats, that Comets only can execute successfully; and only a Comet, originally constituted as this of ours in our second chapter is shown to be. For unravelling the mystery, the sacred author has furnished

us with ample means, not only in the precise recital of his facts, but in the more definite details of dates and numbers. These he intended should be used and carefully examined; and as they constitute the key to the grand arcanum, we propose, by their aid, to unlock the casket and reach the hidden treasure.

To present the subject in as familiar a light as possible, and to prevent continual embarrassment from the use of the antiquated dates mentioned in the record, we shall substitute those of our own time corresponding with them. At the institution of the Passover, the beginning of the year was certainly fixed about the vernal equinox, prior to the writing of the Pentateuch; and as no other is referred to in the scriptures, not even as regards the primitive period, it may be accepted that no difference in fact existed between the antediluvian and Mosaic times, or that, if there did, the same was properly adjusted by the sacred writer,so as to conform to the Jewish calendar. They who have deeply investigated the subject, affirm that the ancient year began on the 15th day of our March; and as that date is sufficiently near to truth for the purpose of our present inquiry, it may be adopted without further examination. In the narrative of the flood, our author, to guard against any misconception, with his usual particularity informs us, that from the 17th day of the second month to the 17th day of the seventh, a period of five months, was equal to 150 days; an allowance it is evident of thirty days to each month. With these lights to guide us have our dates been fixed.

We may here premise, that the usual construction of the biblical account of the flood is grossly errone-

ous, and arises simply from man's abiding conviction of the stability of the earth; a conviction that deserts him when the earthquake comes, and the ground beneath his feet begins to rock and roll. Then his confidence forsakes him, his trust fails, he stands corrected and appalled, and knows not whither to turn for safety. That the common opinion is incorrect, is palpable; for in addition to the fact that the learned author expressly and positively affirms that the primitive earth was utterly destroyed, it is incompatible with a decent respect for his understanding, to believe him capable of saying that water fifteen cubits deep, could on the present earth buoy an ark to Ararat's height; and that a rain of forty days' duration could make a flood sufficiently great to cover the tops of all our mountains, and then require a period of one hundred and fifty days to make its escape from the earth, and again to return to the sea. Such a view may suit the scoffing derision of scepticism, but is manifestly inconsistent with the sacred author's character. He is not to be so understood; and we should seek some other solution of his account of an universal flood, and, by sincerely seeking, we shall find it.

On the 23d day of April, in the sixth hundredth year of Noah's life, and in the year 1656 from the creation of Adam, according to our accepted version, it was the Lord notified Noah that within a week he should complete all his arrangements and make every preparation for the forthcoming deluge, by which he purposed to destroy every living being that he had made.

On the 30th day of the same month, "Noah, and Shem and Ham and Japhet, the sons of Noah, and Noah's wife, and the three wives of his sons with

them, entered into the ark," and then, in the gentlest and most orderly manner, followed them, "every beast after his kind, and all the cattle after their kind, and every creeping thing that creepeth upon the earth after his kind, and every fowl after his kind, every bird of every sort.

"And they went in unto Noah into the ark, two and two of all flesh wherein is the breath of life.

"And they that went in, went in male and female of all flesh, as God had commanded him; and the Lord shut him in."

They have scarcely entered and closed the opening of the ark, when we are told that on the same day, the 30th of April, all the fountains of the great deep are broken up, the windows of heaven are opened, and a storm of rain ensued that lasted for forty days and nights.

To the poetic minds of the East, the blue vault of the skies appeared as curtains suspended before the windows of heaven, through which by night they could easily perceive the twinkling of the celestial lamps. Such a metaphor is here introduced, and, these curtains on this occasion are represented as withdrawn, the windows themselves thrown open, and, for the first time astonished Noah and his sons are permitted to behold the dark and angry rain-clouds pregnant with destruction. By these were the heavens completely over-spread, and from them came the impetuous floods. The scene thus presented is surely inconsistent with what we have been told before. The Adamland has been described and understood as a rainless country, and now it rains in torrents. Presently, too, we learn, that in this land of harmo-

nies, where ærial currents were never excessive, the winds begin to blow, and with such force as to merit a notice in this brief and compendious history. That too, is seemingly inconsistent with our former conceptions of this Adamland. Then again, as another strange phenomenon visible on that occasion, we are told, "that the fountains of the great deep are broken up." Rather a singular group of events for such a pacific country! But what can the sacred author mean by such an extraordinary description? by a combination so singular and unusual for the olden world? What can be meant by "fountains of the deep?" What could Noah have seen, that he could thus designate by such a phrase? A fountain ordinarily implies a jet or spout of water, and the phrase, "fountains of the deep," would imply that he actually beheld great jets of water, boiling and spouting up from the surface of the ocean. The reference clearly is to the submarine volcano, such as have often been seen since Noah's days. This is what we should understand by ocean's fountains.

To elucidate the matter, we briefly transcribe from Sir Charles Lyell's Principles of Geology, a description of these phenomena as they have presented themselves in modern times:

"*Submarine Volcanos.* — Although we have every reason to believe that volcanic eruptions as well as earthquakes are common in the bed of the sea, it was not to be expected that many opportunities would occur to scientific observers of witnessing the phenomena. The crews of vessels have sometimes reported that they have seen in different places, sulphureous smoke, jets of water and steam rising up from the sea; or they have observed the waters greatly

discolored, and in a state of violent agitation, as if boiling.

"*Graham Island in* 1831.—About the 10th of July, John Corrao, the captain of a Sicilian vessel, reported that as he passed near the place he saw a column of water, like a water-spout, 60 feet high and 800 yards in circumference, rising from the sea, and soon afterward a dense steam in its place, which ascended to the height of 1,800 feet. The same Corrao, on his return from Girgenti, on the 18th of July, found a small island 12 feet high, with a crater in its centre, ejecting volcanic matter and immense columns of vapor—the sea around being covered with floating cinders and dead fish—the scoriæ were of a chocolate color, and the water which boiled in the circular basin was of a dingy red. The eruption continued with great violence to the end of the same month."

These immense foaming, boiling vortices, and these enormous jets in varied forms, were the phenomena witnessed by the ancient patriarch; and not only one alone and isolated; but many, yea, so many, that he, in strong and significant language, says, "*all the fountains* of the great deep were broken up."*

As the winds before referred to did not begin to blow until the end of the forty days, we may and should conclude, that during that time the earth was oppressed with a deep and solemn calm. Excessive storms of rain, such a total stagnation of the atmosphere as often produces a sinking despondency of the heart, with other unusual conditions of the physical elements, are the common attendants upon vio-

* "Open" substituted in our translation for the preposition or verbal termination "up," or both combined, "*up and open*," would more lucidly present the evident meaning of the writer.

lent volcanic action. Their presence is not at all unnatural; and the scenes depicted, and viewed at first as oversights and inconsistencies, now become the surest tests of truth, and serve as trusty beacons to guide us in our search.

With these combined and gigantic powers, the flourishing Adamland is assailed and doomed to inevitable destruction. The earth is covered with rushing currents and rapid torrents, that undermine the works of art and uproot the varied forms of nature; and the ocean furiously aids the havoc, in the impetuous billows and angry waves that it continually hurls upon the land accursed. The world is wrecked and overwhelmed, and a scene of confusion and despair ensues, that defies the fertile powers of imagination to reproduce. A boundless sea on every part exhibits "the wreck of matter and a crush of worlds;" the bridegroom and his bride, the screaming mother and tender infant, the old and young, the gay and grave, the sick and well, are battling with the tumultuous waves. The gigantic beasts and reptiles, terror stricken, are floating upon the surge. The ruined cities, the forests, fields and gardens add complication to confusion; whilst the birds of air, mingled with the insect tribe, hover over the scene, and, with doleful and discordant notes, solemnly toll the knell of departing life. Some find, near by, a ready burial beneath the main; others, by ocean currents, are hurried for sepulture to the surface of an uprising world; and others, again, are borne to the distant regions of the north and there embalmed amidst the arctic ices.

For forty days does Noah—within his ark, still

resting upon his former fields—with anguish witness the saddening ravages of the destroyer's hand; for forty days do the drifting corpses and floating fragments still assure him that the obedient agencies are faithfully discharging their doleful duties; and, with an ever-watchful eye, he at last beholds the last of the mountain tops of his native home and land, submerged beneath the flood, doomed to rise no more. With the last memento thus removed from sight, with a heart heavy, sad and sore, in the midst of an endless waste of waters, a boundless ocean without a shore, well might he, in his journal, write it down, that in such an hour God remembered Noah and the trembling beings with him in the ark, and kindly sent a wind, an easterly wind, to drive the waters from off this sunken land and waft him to another world. Now, the forty days are ended; the windows of heaven again are closed; the fountains cease to play—perhaps they steam and smoke—and the ark, with all its freight, upon water fifteen cubits deep, is felt to float. The record of this closing scene announces the 9th day of June.

The sacred writer, as to particulars seemingly trivial, though truly important, is careful to mention, that at the end of the forty days, the water attained the height of fifteen cubits, and then "it lifted up the ark from off the earth;" and that no sooner does she float, than she commences to drift away from her first position. Then, says he, she "*went upon the face of the waters.*" Whither, then, did she wend her way? and in what haven did she find an anchorage? These questions are not only definitely answered by the author, but other information is also imparted by which we may

readily *retrace* her course, and estimate the distance accomplished in her voyage. For 110 days, he says, impelled by winds and currents, she continued to plough the deep, and finally, on the 30th day of September, grounded upon the mountains of a country known in Moses' day as Ararat. As the ark drew but fifteen cubits, of course the mountain tops she rested upon must have been at that time that far beneath the surface; and here it should be remembered that the waters have risen no higher, not a single inch, than they were on the 9th day of June—the last of the forty days of rain.

The facts thus precisely stated, with others to be noticed, clearly indicate, and can only be explained by, what geologists term "subsidence and upheaval," instances of which have often occurred, on a limited scale, within modern times. The ancient Adamland has gradually sunken down beneath the ocean to become its bed; whilst the bottom of the former deep has been as gradually upheaved, to form a new earth for man and beast to live upon. In this suggestion, except as to its proportions, there is not the slightest novelty; for the fact is well established that such mutations are frequent in the great field of nature; that islands have been known to sink and disappear, and others have suddenly emerged from the deep, and that portions of our continents are steadily undergoing changes in their elevation; whilst one exhibits a continual subsidence, another shows an equally constant upheaval. The phenomenon of Noah's day differs from those of modern times only in the grandeur of its dimensions.

The ark was built and rested upon the shores of a

former world—that "dry land," that on the third day of the creation was upheaved or emerged from the then single great ocean. The last of that "dry land" was seen on the 9th day of June in the year of the world 1656. The world that then existed utterly perished, with every living thing upon it. The present earth, at that time, existed only as the ocean's bed, and did not constitute any part of the land that by God was pronounced corrupt, and by him visited with destruction. As that one vast continent sank beneath the waters, its immense weight pressing down upon the liquid interior of the globe, forced up the present continents that now surround its former site. Scripture, science, and the voice of nature, all proclaim that the great Pacific, beset with submarine mountains, and sunken shoals, studded with hosts of coral reefs and islands, and illumined on every side by volcanic fires, is the resting place of the world destroyed. There, beneath its tranquil waters, repose the relics of the ancient dead, where, from Noah's day, the little, considerate madrepores have been busily engaged in erecting monuments to their memory—

> "How mournfully this burial ground
> Sleeps 'mid old ocean's solemn sound,
> Who rolls his bright and sunny waves,
> All round these deaf and silent graves!"
>
> JOHN WILSON.

The ark must have at first reposed upon the coast of the ancient Adamland, or else Noah could never have seen the fountains of the deep. There upon the western shore he had his home, raised his grapes, his

figs and olives, enjoyed the lullaby lays of the sea breeze, watched the ebbing and flooding tides, and learned that an easterly wind would blow the waters from off the earth. He too, no doubt, had noticed for one hundred and twenty years that the ocean was regularly encroaching upon the land, had made his marks, and erected objects at the water's edge, for the confirmation of his belief. Assurances thus derived, strengthened his faith in his Maker's word, and nerved his arm to build the ark, notwithstanding the continual jibes and jeers of his incredulous workmen, and the scoffing jests and sneers of unbelieving friends and neighbors.

But where was the ark built? From what point or place in the Pacific did she come? To answer the question with absolute precision, may be impossible; yet as the ark was not impelled either by steam or sails or oars, and only yielded to the constant laws of Deity, as invariable as their Maker, a solution of the problem may be obtained, sufficiently near to truth, to satisfy the mind of rational faith, and perhaps unsettle even the sceptic's doubts. To ascertain the course and distance of the voyage accomplished, it will be necessary to appreciate several distinct elements, each of which played their part on that occasion; and to arm the reader properly, we shall devote a few pages to their consideration. We select first the tides, and as Professor Johnston has luminously discussed the subject, and presented us with a *supposititious* statement as to their order, such as really *existed then*, and therewith combined an account of things as they are

at present, we transcribe from his Physical Atlas, prepared in 1848, a part of what he has written:

THE TIDES.—"If the earth presented a uniform globe, with a belt of sea, of very great and uniform depth, encircling it round the equator, we should have a rise of tide or high water following the sun every day, from east to west after midday, and another succeeding it after midnight, when the sun had passed the meridian of our antipodes. This phenomenon, Sir Isaac Newton deduced from the laws of gravitation to each other of the mass of the sun, the mass of the earth, and the mass of the water. In like manner each transit of the moon over the meridian would bring after it, also, a tide or high water; and, owing to the smaller distance of the moon, its effect would be greater in raising the water than the effect of the sun, in a proportion nearly six-fold. In this state of matters we might expect four tides a day. These, however, would so modify each other as to produce only two great tides compounded of the four. When the transit of the sun and moon took place together, their joint effect would raise a tide measured by the sum of the effects; that is, the lunar tide would be increased one-sixth by the solar tide. But on the other hand, when the transit of the moon was about six hours later or earlier than the sun's, the low water of the one would diminish the high water of the other, and so the lunar tide would be diminished by one-sixth. Thus the mean tidal elevation of high water would vary nearly in the proportion of 5 to 7. At new and full moon, the tides would range higher—forming spring tides; and at the first and third quarters, the tides—forming neap tides—would range lower. When there were twenty-one feet of rise of high water above low water at springs, there would only be fifteen at neaps. Had the earth been formed as we have supposed, with a great equatorial canal, or central belt of ocean, the phenomena might have taken place as we have stated, with great regularity; and we should

not have required to form a tidal map or chart, for the crest of high water would have been nearly—not exactly—a meridianal line, following the sun and moon at certain very simple intervals. This simple case is, however, very different from the fact; the heights of successive tides and their intervals vary much in the way we have described, but the direction of motion and the epoch or date of high water are exceedingly various; so different, indeed, that no adequate notion of tidal phenomena can be formed without some such tidal charts as accompany this paper.

Looking at the chart of the world, we observe that there is no great equatorial sea extending east and west round the globe. On the contrary, the great continents cross the equator nearly at right angles; the Atlantic running nearly north and south between Europe, Africa and the Americas. The chief region of water appears in reality to surround the South pole; and if we recollect how peculiar the nature of the Pacific is; how much it is intercepted with coral reefs and islands and irregular continents, we shall readily perceive, how far it is removed from the condition of an equatorial canal of uniform, unimpeded depth; presenting, on the contrary, a coral barrier nearly impervious to tidal action.

The source of the tides is therefore to be sought in the great reservoir round the Southern pole. This polar reservoir is agitated on opposite sides by the moon, in its alternate lower and upper transits; and by the sun in a less degree. Here the great central agitation seems to commence, and hence on all sides it seems to flow northward. From the South pole this great agitation flows into the Indian Ocean, and proceeding northward, the great tidal wave strikes with violence on the shores of Hindostan, and finally breaks in the mouth of the Ganges, where it expends its force on the shores, in the form of the well known and terrific "bore" of the Hoogly. The Atlantic in like manner receives from the Southern reservoir its great wave of tide, which passes north with impetuosity, and expends its force on the shores of Britain

and North America, where again it becomes the enormous stream tide of the British channel, and the destroying surge of the Bay of Fundy, so well known to all mariners. The Pacific should receive its great tide were it not barricaded out by innumerable submarine steppes, and its thousand coral reefs, and its myriads of happy islands, to whose calm seas no propagation of this horizontally acting wave can gain access. In the north Pacific we have neither the 'bores of a Hoogly,' nor the terrific tides of a Bay of Fundy.*

Commencing with new or full moon, let us take the spring tide, or largest tide formed by the coincidence of the actions of the sun and moon. Let us conceive that this joint action has taken effect on the waters of the Antarctic Ocean; that the luminaries in conjunction or opposition have passed over the mass of waters lying east of Van Diemen's Land, New Zealand, and the South Pole, and have communicated to them motion in the direction of the resultant forces; we shall, manifestly, have a mass elevated and moving to the north and west, following the luminaries. The motion thus communicated to this mass of water, has raised a large mass or moving ridge of water, which cannot expend its forces acquired, but by pushing before it other masses of water, and raising

* The uncouth terms, "tide-rips," "bores," and "eagres," are nautical designations for those immense tidal waves experienced in certain bays and rivers of the earth. They rise to great heights—to 30, 60 or even 70 feet—rush with impetuous violence, and often with a speed of sixty miles an hour overtake and engulf the fleetest deer, swine or other cattle and beasts that graze upon the beach. Boats unskillfully managed are surely overturned, but the crafts of those familiar with the danger are so managed that they bound to the summits of the tidal wave, and again descend in safety. The passage of the "bore" and "eagre," is quick, sudden, and of but short duration, yet a cessation of business is requisite to prepare for its approach. Vessels dare not remain near the wharves and shores, but seek the middle of the streams to surmount the surge with safety.

them too, in a wave, to which all its force is finally imparted. In this way, the wave originally generated travels northward and westward, long after the bodies generating it have ceased to act on the first mass of water.

"It will be observed how much the *figure of the shores*, and the *form of the bottom*, and the *direction of incidence of the tidal* wave, affect the *height* of the tide. The whole range of the Atlantic tide, even at ordinary springs, does not exceed 10 or 12 feet in open or deep sea. It reaches the southwest of Ireland unchanged. On entering the German Sea on the north of Scotland, it does not exceed 12 feet, but gradually increases to 14, 16, 18, and in the Humber to 20 feet, as it travels along a shore continually shelving, and which it strikes with constantly diminishing obliquity. In the same way a slowly shelving bottom and oblique shore at Bristol and Liverpool and at St. Neots raise the tide to a range even of thirty feet."

Tides, whether in the Southern seas, or on the equator, are produced by the bodily uplifting of the waters of the ocean to the height of ten or twelve feet. Of course there must be a rush of waters below, as an under-current, to fill the space that would otherwise be vacant. Their form is that of a common roof, highest in the centre, and gradually sloping away to nothing on its outer edges. In extent they cover an area of from 45° to 55° on each and every side from the centre of attraction. Water raised in this way, must, by the laws of gravity, fall again to a common level when the powers that upraised cease to sustain it; and rapid must be the tidal wave in seeking to restore the equilibrium; for in six hours, over this extended area, the low tide invariably follows the high. Yet it is done, not by running off with this immense velocity from the centre, but by a

pushing motion, as Prof. Johnston describes it. The water of the ocean consists of several different strata, varying in temperature, and not readily disposed to mingle; but twice a day by the heavenly bodies is it lifted up and dropped again, and thus the strata are shaken together, forced to wrinkle, fold back and double up, ensuring their commixture. Although in a period so limited, the tide is felt throughout great distances. The actual transfer of the water itself does not exceed from four to six miles per day. The real difference between this actual transfer and the tidal-wave, has been experienced by most persons, who, when attempting to bring to the shore an object floating on pond or river, have thrown some heavy matter just beyond it. Upon the first throw, a wave is excited, that quickly reaches the shore and possibly wets his boots; and yet the object has ridden the waves and really moved but little. The effort is repeated, but only with the same result; the wave again has come, but left the bird; and frequent repetitions are required before the object comes to land. In this experiment he learns the difference between the "tidal-wave" and the actual drift of the water.

Drift of the Sea.—"If we imagine," says Professor Maury,* "an object to be set adrift in the ocean, at the equator, and if we suppose that it be of such a nature that it would obey only the influence of sea-water and not of the winds, this object I imagine would in the course of time find its way to the icy barriers about the poles, and again back among the tepid waters of the tropics. Such an object would illustrate

* Phys. Geog. of the Sea, 308.

the *drift of the sea*, and by its course would indicate the route which the surface-waters of the sea, follow in the general channels of circulation, to and fro, between the equator and the poles." "The rate—of this drift—according to the best information that I have obtained, is at a mean only of about four knots a day—rather less than more."

Currents of Air or Winds.—As we have before discussed the winds, it is needless to do more than remind the reader that within the parallels of 30° north and south of the equator, the easterly or trade winds uniformly and steadily blow in the same direction from east to west, unless by some island, desert, or region of a continent heated to excess, on either hand they become diverted. Whilst their chief course is westward, their destination is the equatorial calm belt. Outside of these parallels, they reverse their direction, and blow from the southwest towards the northeast, and, yet, not with such constancy, but that in certain parts of the ocean they have acquired the nautical name of "variables." As Noah has entered in his journal, that the winds aided in his delivery from the land of doom, it may be as well in this place to estimate their value on an extended cruise.

The very reference to them in the Scripture assures us that they were something more than merely pleasant and agreeable breezes, and as designed to be, so they really were of the serviceable kind. Such are the trade-winds, and their velocity, according to Professor Maury, is ascertained to be twenty miles an hour. The impulsive power pertaining to such a speed, experience has fixed at nearly two pounds upon every square foot of surface acted upon; and

as the force is applied continuously, it would produce an uniformly accelerated motion; equally so with the force of gravity operating upon falling bodies. Were the ark and its load so distended as to become as light as the lower strata of the atmosphere, they would, like a balloon, be supported by the fluid, and be hurried along with it at the rapid rate of twenty miles an hour. But the ark was situated very differently. One-half of it was immersed in a fluid 800 times the weight of air, and only the other half subjected to the impulsive power of the winds. Making an estimate for the ark in this position, if we assume that for the first hour, the wind alone would produce a movement of only three feet; but the force still continuing, the second hour would secure an additional yard; and each successive hour would add three feet to the motion previously acquired, until the final velocity attained would equal that of the winds, diminished by the resistance of the water. Computing thus for 110 days, we ascertain that the mean average motion of the ark, from first to last, as derived from the winds, would amount to three-fourths of a mile per hour, or eighteen miles per day. In a general way, ships equipped with sails are driven far more rapidly, and out-travel the currents of the ocean, with a speed even three or four times their velocity. The ark, however, was destitute of sails, and could only present her sides to the action of the winds.

The Currents of the Ocean.—To secure the salubrity of the globe, the Allwise Creator imparted to its watery portion such characteristics as keep it in perpetual motion. The winds, heat, gravity, and the lo-

cal abstraction of its saline matters, even by the insects of the deep, all contribute to produce unending movements in the seas. Though seemingly wild and lawless in a general way, the marine philosopher discovers that all its currents, waves and ripples, and every atom of its spray, are ruled by edicts from which they cannot swerve. We view with wonder and admiration the magnificent streams that traverse the length and breadth of continents, encased within their earthen walls; yet they are but rivulets, when compared with those majestic rivers that, within banks of their own briny element, continually keep their course within the ocean's bounds. Within certain limits on both sides of the equator, the intense rays of the sun unduly heat the waters, and lift up an immense amount in the form of vapor, which they transfer to the thirsty trade winds ever present to receive it. The portion thus abstracted must be replaced by other waters, which flow as under-currents from the colder regions. As, in proceeding from the poles to the equator, the distance of the earth's surface from its central axis gradually increases, of course when the earth revolves upon that axis, the parts more distant from it must move with the greater rapidity. At the equator this speed is 1000 miles an hour; in latitude 60°, where the size of the earth is only half of that at the equator, the speed is only 500 miles an hour, and at the pole it is nothing. The cold waters of the polar regions, setting out with the slow motion from west to east, due to their position, as they approach the equator never at once acquire the quicker motion of the lower latitudes, and are consequently left behind in the revolutions of the

earth around its axis. Hence these waters, when they reach the equatorial regions, appear to flow from east to west, contrary to the actual course of the earth in its rotations. They follow the sun in his daily rounds, are known as the equatorial current, and are constantly accompanied, as light and shade, by the easterly trades, which with nimbler wing outstrip them in their race around the earth.

In the Atlantic, we find one of these ocean rivers starting from the coast of Africa, and with a velocity of from 45 to 60 miles a day, flowing steadily from east to west, until arrested in its course by the South American shores. Here at Cape St. Roque, on the coast of Brazil, it divides; one portion flowing southwardly along the coast to Cape Horn, and there mingling with waters from the Southern pole, turns up again in the Pacific for the tropics; the other portion flows into the Caribbean sea, as if determined to continue its westward journey, but finding the isthmus in its path, it is forced to turn about, and as its only resource seek the polar regions. Issuing from the Bahamas, it rolls its huge and heated volume northwards until it reaches the icy shores of Greenland; and thence it despatches to the open polar sea, so much of its heated waters as the frozen passage will admit, and the residue, on its way dispensing blessings to Western Europe, returns to the equatorial furnace for a fresh supply of heat. So true and constant are the ways of nature, that within this rounded circuit of the Gulf Stream is found to-day the same great lake of dead water, covered over with sea weeds, just as it was seen by Columbus in 1492.

In the great ocean another river is found more

than 3,000 miles in width, traversing its entire extent. On the south side of the equator its waters are so thwarted and diverted by the multiplicity of continents, islands, shoals and reefs which they encounter, that the "Southern Equatorial Current" presents a puzzle to the philosopher of the seas. On the north side, however, it is entirely different. There, the mighty stream maintains its majestic and steady course from Mexico, entirely across the ocean, and is only stopped by the eastern shores of Asia. Here it is obstructed, and, like the Atlantic Gulf Stream, it turns northward, and wending along the coasts of China, Japan and Kamschatka, warms up the northern Pacific, even Behring's polar gate; and thence returning along the American coast, it still retains heat enough to attemper the climate of California and Mexico, and give to it the happy character which it possesses. Captain Charles Philippe De Kerhallet, of the French Imperial Navy, has devoted especial attention to the Pacific, and favored the world with a volume describing its many winds and currents. From it we learn that the width of this great equatorial river extends from the 26th parallel of south to the 24th parallel of north latitude, and that the steady and uniform portion of it north of the equator, styled the "North Equatorial Current," travels with the velocity of thirty miles a day.

Outside of these limits we nowhere find currents of like character, flowing so persistently, with such speed, and keeping an invariable course with the shifting winds Such as have attracted the attention of navigators seem to be more irregular in course, more limited in extent, and to flow more sluggishly

from the polar regions towards the equator, and with a strong eastward tendency. Their velocity and power are not sufficiently great to impress the casual observer.

Prior to the destruction of the Adamland, the ancient ocean necessarily had its polar and equatorial currents, not differing essentially from those we have above described. The equatorial, especially on the northern side, was probably wider and extended farther north than that existing in the Pacific, as at present bounded, and starting from the western shores of the ancient continent, kept one continued circuit around the globe, until obstructed by its eastern coasts, where its waters would naturally divide, and on either side, as modern gulf streams, seek the polar regions.

To render the scriptural description of the flood as lucid and intelligible as possible, before proceeding to its discussion, we ask the reader to conceive that he is occupying a safe and elevated position within the tropics, at some point, for instance, on the western portion of Africa. The eastern coast of that continent presents to the currents of the Pacific or Indian Ocean a barrier to their further progress westward; whilst from its western shores a rapid current flows steadily across the Atlantic to America. If a gradual subsidence of that continent were to occur, the spectator would see the waters of the Atlantic rushing in upon the sinking land, and flowing from west to east; and if the fountains of the deep around its margin were at play, he would also observe the huge waves of the deep successively following each other in the same direction. In this way would the ocean,

within the limits of his vision, appear to advance upon, rise above, and overcome the land, so long as an extended mountain chain or elevated ridge remained between the waters of the Pacific and Atlantic. But so soon as the parting crest or elevation should subside beneath the surface, then would he at once discern an universal and immediate change in the scene around him. The great influx of the Atlantic waters would be seen to pause and cease their flow from the west; whilst the broad current from the Pacific, no longer obstructed, would begin its flow, and present a mighty stream running from east to west entirely across the sunken surface, and continuing its unbroken course for the American shores. The spectator would plainly discover that the waters that first rushed in from the west, to drown the land, had now reversed their direction, and were running continually from off the sunken continent and flowing towards the west.

As we have supposed the reader to have been, so was Noah really situated within the ark, on the western shores of the Adamland, within the tropics, but on the north side of the equator; and the events and changes witnessed and recorded by him are precisely similar to those which our reader is conceived to have witnessed from his position in tropical Africa.

During the forty days, the waters, as well those issuing from the windows of heaven, as those rolling in from the fountains of the deep, are represented as combining to overpower and destroy the earth; and at the end of that time their joint efforts are said to prevail and secure the victory.

Then it was that all the high hills and mountains were covered; and then, too, it was that a change in the scene occurs, as the inflowing waters are "assuaged," or, as the original would more expressively suggest, "desisted," as if spent with labor or fatigue.

At the expiration of the forty days, after the hills and mountains have sunk beneath the waters, and after the influx has assuaged or ceased, Noah affirms that then the waters *returned*, or turned back, from off the earth continually; or, in other words, reversed their former direction, and, instead of flowing from west to east upon the land, they now turned about and ran from off the land, pursuing a course opposite to the first.

That herein is alluded to, the grand equatorial current of the Pacific we have before described, now no longer restrained by an existing continent, nor checked by coasts or mountain barriers, that for the first time traversed the breadth of the ancient world, and from that day to this has steadily maintained its course from America to Asia, will be fully apparent when all the attendant facts are fairly weighed and properly considered.

It was at the end of the forty days, on the 9th day of June, that this reversed motion of the waters began to flow "from off the earth," the sunken earth, and the only earth that had hitherto existed, and the only one that Noah knew. This flow was from east to west. Then, we are told, "the ark was lifted up above *the earth*, and went upon the face of the waters." For 110 days the ark was transported by wind and wave, and throughout the entire voyage no change in the course of the waters occurred, but the current con-

tinued to flow as it at the outset began. "And the waters returned from off the earth continually," and only *abated* after *the end of the* 150 *days*, when the ark rested upon Ararat; and why they abated then, will presently most distinctly and satisfactorily appear. Here, then, we have most clearly described an ocean river, pursuing one continuous direction for nearly four months, without intermission.

At the end of the forty days, God remembered Noah and the creatures with him in the ark, and graciously sent them a wind. Why, and to what end? and what benefit could they derive from atmospheric currents in their imprisoned condition? Most assuredly the purpose was not solely to assuage the waters and clear the skies of clouds, but mainly to *aid* the ocean river in transporting the tenants of the ark from the earth destroyed to their destined homes in an uprising world. This wind, however, could be of no service to those to whom it was sent, unless it coöperated with the moving waters, and exerted its powers in the same direction. The easterly trades are here evidently referred to, and when the final resting place of the ark is remembered, no doubt can be entertained but that the equatorial current—at present checked by the shores of Asia—in Noah's day flowed entirely around the globe, and, with the accompanying easterly winds, bore the ark to the land of Ararat. The original site of the ark, or Noeville, as we may term it, was therefore between the equator and the 24th parallel of north latitude; for it is only within these limits that the winds and currents are found uniformly concurring in force and direction; and *nowhere outside* of these bounds could such winds

and currents be found existing together as would or could take the ark to Ararat. Outside of the 30th degree we have found the winds blowing north-eastwardly towards the pole.

The ark fully afloat on the ninth day of June, and impelled by the ocean current at the rate of thirty miles a day, and still faster urged by the winds at an average daily rate of eighteen miles, making forty-eight miles a day, must in the 110 days of her voyage have accomplished the distance of 5280 miles, westward from Noeville. But during this time she is also driven northward by the natural drift of the sea, referred to by Professor Maury, at the steady rate of four miles a day, without any reference to tidal influences; and consequently at the end of the voyage she should have been found 440 miles farther north than her original position.

By the distances and departures thus ascertained, if the ark had rested upon the meridian of 45° west longitude (the meridian of the present Mount Ararat) she should have been found west of the Euphrates, on or about the 30th parallel of latitude, and should have come from a point in the Pacific Ocean more than 1000 miles *east* of Canton in China, on or near the Tropic of Cancer; and as it is evident, from the fact that the sons of Noah, after the flood, in approaching Shinar journeyed from the east and not from the west, that the ark did not cross the Euphrates at all, yet if our distance be traced backwards from that river eastwardly, the unmistakable proof is furnished that the site of Noeville was undoubtedly within the bounds of the Pacific Ocean, and far to the east of the Asiatic coast.

The scriptures affirm that the ark reached some point in a country known in ancient times as Ararat. What were the boundaries, or even the true position of that country, cannot now be fully ascertained, much less the mountain upon which the ark finally reposed. Modern Armenia, north of Persia, has been very generally, upon strong grounds, accepted in later times as the ancient Ararat; and, if correctly, the ark should have been borne several degrees farther north than she would have been by currents flowing regularly from east to west, undisturbed by local causes. It is, therefore, necessary to inquire whether it were possible for such a deviation of the ocean's currents to have occurred, as would take the ark out of its westwardly course and land it on the mountains of Armenia, in the high latitude of 39 1-2 degrees. At first view it would seem unnatural and impossible; but an investigation of the subject leads to the irresistible conclusion, that the waters upon which the ark was borne must necessarily have passed over the Armenian heights, in obedience to well known physical laws that were then in operation. As in the continent of Asia we have presented for our examination the bed of the ocean as it existed in the days of the flood, we can readily observe and properly estimate the causes that controlled the course of the waters in Noah's day, and thus attain conclusions of the most satisfactory kind. Only a brief reference to the leading particulars is necessary to enable the reader to appreciate the true position of the ark and the circumstances surrounding her; and the careful consideration of them not only explains the direction and incidents of the voyage, but

also clearly elucidates many other geological phenomena now wrapped in the folds of mystery, and securely shrouded against even the most ingenious conjecture.

The currents of the ocean are set in motion by the evaporation within the tropics produced by solar heat. The water abstracted in the form of vapor would destroy the natural equilibrium, and its place would be filled by other waters from the poles, coming in as under-currents. A counter flow from the tropics would ensue, establishing a continued circulation between the polar and equatorial regions. The greater the evaporation, the more rapid would be the speed of such current and counter current; and if solar heat alone be sufficient to produce them, much more would be their velocity, when induced by the same heat, aided by the calorific powers of a multitude of volcanic fires. "All the fountains of the deep" would contribute greatly to the evaporation of the diluvial waters, and thereby accelerate their westward velocity and increase their northward tendency. Our recent experience with the earthquake and volcanic action of the West Indies during the last year (1867) may be cited on this point; as the gulf stream is reported for several months after such action to have fully doubled its usual speed. The great increase in this case, however, is certainly attributable to the narrow and confined limits of the heated waters.

"Currents," says Professor Johnston, "invariably increase their velocity as they approach the coasts, and run parallel with their direction." Being compressed by the colder waters on their outer boundary,

and unable to drive the land aside, they yield to the impulsive force and hasten themselves to escape the pressure.

Water in motion, like all other matter, is subject to the law of forces. Motion once imparted, is continued in a direct line, until it be diverted by some opposing obstacle. Bullets, cannon balls, winds, rivers and ocean currents, are turned from a direct path by obstructions to their progress. The marine currents suffer great deflection from these causes. Professor Johnston, on his map, represents the great Atlantic current as throwing off a lateral arm in mid-ocean to the northwest; induced, as he affirms, by some shoal or island, sunken greatly below the surface. The submarine steppes and mountains of the south Pacific, produce in the currents of that region such irregularities as perplex the scientific philosopher. This fact can excite no astonishment when the operations in the fields of nature are carefully noted. If we suppose a deep and strong current flowing from east to west, suddenly to be confronted by a submarine mountain chain, it is sufficiently manifest that the lower strata to surmount the elevation must necessarily lift all the water and atmosphere above it, and to a height equal to that of the sunken barrier above the ocean's bed. The upper strata, however, being extremely mobile, and yielding to the overruling force of gravity, instead of ascending to so great a height would laterally flow away upon the surface, and in that direction which the position of the hidden barrier would impose. If the sunken barrier obliquely crossed the path of the waters, an oblique

deflection would be produced below, and be equally manifest in the diverging current upon the surface.

As without a map or chart it is impossible to understand the travels of St. Paul, or the marches and campaigns of a Napoleon or a Washington, from the written descriptions of the historian; equally impossible is it to comprehend the course of the diluvial currents and Noah's voyage, without an adequate knowledge of physical geography connected with the subject. Only to a few of these prominent features shall we at present refer.

When the ancient Adamland sank beneath the waters, it did not everywhere sink alike, nor were all its parts submerged at once. Some sank but little, and some portions are still remaining. From the southeastern part of Asia, throughout the Pacific towards South America, we find one continued and extended cluster of shoals, reefs, islands, sunken volcanoes and continents. That this portion of the ocean is comparatively very shallow, the great number of coral islands discloses; for they are not, as was formerly supposed, built up from the vast depths of the sea, as the little insect is incapable of living and laboring in water exceeding in depth 120 fathoms. This fact is well established by Sir Charles Darwin, who has devoted especial attention to the subject, and he affirms that all their structures are erected upon shoals and submarine mountains. This vast group is the remnant of the Adamland, and though covered, perhaps, with water, existed in Noah's day, and acted as a deflecting barrier to the equatorial current. Its crest or axis, in its general direction, runs from the southeast towards the northwest, in

the course of the equinoctial line, crossing the equator at an angle of $23\frac{1}{2}^{\circ}$, or nearly so.

Now, if "these innumerable submarine steppes, these thousand coral reefs and myriads of happy islands," can effectually barricade out of the North Pacific, the great tidal-wave generated in the Southern Ocean, and so deflect it as to cause it to break with impetuosity upon the shores of India, and pile up its waters in the Ganges, so as to form the gigantic Hoogly; equally efficacious would it prove as a barrier on the other side, to barricade in the great southern equatorial current, and deflect its waters northwards of the equator. The natural tendency of this dam in the ocean would be to turn the southern waters from their natural course, and cause them to accumulate over the regions now known as Asia. That the islands of the Pacific were formerly more continuous and connected than at present, will not be doubted by any one conversant with the laws of nature. All streams and rivers, whether of the ocean or the land, when possible, invariably excavate for themselves suitable channels for the easy passage of their waters; and they labor incessantly in such operations, until their own weight and velocity are equalized by the obduracy of the material composing their banks and bottom. Instead of raising heavy volumes high above an opposing barrier, the width and depth of the passway are increased, until the speed of the water is reduced, and its force diminished so much as to destroy its ability any longer to abrade and remove the matters that support and confine it. In this way have the channels of great and unfathomable depth been, in the course of ages, excavated between

the islands, by the unwearied friction of the equatorial current, whose divided waters now flow between them, with ever varying velocities.

In the leading mountain chains of Asia, the north equatorial current, with its heaped up waters, acquired from the south, would be urged still farther northward, and yet continue on its westward course. The ranges of Cochin China and the Birman Empire, bearing to the northwest, would drive the current in that direction; whilst the western Ghauts, along the southwestern coast of the Peninsula of India, would greatly augment the volume of the stream, impel it in the direction of its own flanks, and increase its speed. These mountains are of very considerable height, and are 500 miles in length. The ocean river thus flowing over southern Asia, would on its north side be checked and restrained by the elevated bluff and precipitous sides of the Himalaya and Hindoo Koosh. These mountains, together, compose the highest and most continuous chain upon the globe; and as they begin in China, in the east, with an elevation of 28,000 feet, and, bearing north of west, terminate only about the eastern border of Persia, with a height of 25,746 feet, they would serve as the wall of a canal, to guide the flowing waters westward.

Although the Hindoo Koosh ends near Persia, another chain north of it, known as Kuen-lun, continues the westward wall until it passes the Caspian Sea, where it turns to the north and connects with Caucasus to form the northern boundary of Armenia or Ararat. On the west side of Armenia, Mount Taurus stands; and connected with it is another ele-

vated chain, known by different names, sometimes as Kurdistan, and others by the classic name of Zagros. These mountains begin upon the southern shore, east of the Persian Gulf, and thence with unbroken flanks run northwestwardly until they reach and join with Taurus, on the west of the land of Ararat.

Armenia is an elevated plateau, surrounded by mountains on every side, save the southeast; and is really situated at the narrow end of a funnel-shaped passway formed by the Zagros on the one side, and the Himalaya system on the other. Caucasus, Taurus and the mountains west of them, at the termination of the Hindoo Koosh, are much lower than the summits of the Himalaya to the east; and, consequently, the waters hitherto accumulated and compressed against the flanks of Himalaya, would over the mountains of Ararat first find relief from their pressure, and flowing over them from the converging passway on the southeast, diffuse themselves over the wide waste of waters upon the north. To aid and force the great river through this passage over Ararat, the Zagros, as an impassable barrier to its further progress, stands obliquely across its course, and directs all its waters towards the northwest. To produce such a result, the value of this chain was immense; as its summit could have been but little below the surface, as the ark a few days thereafter grounded in water only fifteen cubits in depth. Without the deflecting powers of the Pacific islands or the Ghauts, the Zagros mountains of themselves might have proved sufficient to divert the ark from her westwardly course, and land her on the spurs of Taurus. In addition to these geographical features, still ex-

isting to speak for themselves, there was another, that upon a world of water would exert a powerful influence upon a floating body. Throughout the entire voyage the ark would be buffetted twice a day by the great tidal-wave from the south, which then would find no Indian shore to expend its strength upon, and instead of the mouth of the Ganges, would naturally seek the converging glen between Zagros and Hindoo Koosh wherein to exhibit its gigantic "bore."

Whether Modern Armenia, or Thibet, as suggested by Sir C. H. Smith, as the primitive centre, or any other point east of Ararat, be taken as the final resting place of the ark, the fact stands as indisputable, that the waters upon which "she went," during her voyage, was the north equatorial current of the Pacific Ocean; for this, and this alone, of all the ocean's currents, aided by the easterly trades, could have transported her from the world destroyed to the southern slopes or heights of Asia. Noeville then must have been situated south of the 24th parallel of north latitude, and not lower than the 10th, else she would have found her way to Africa, or, after passing west of the Zagros chain, been deflected by the mountains of Arabia, to some uncertain roadstead within the bounds of Europe.

Accepting, then, modern Armenia as identical with ancient Ararat, and the distance accomplished in the 110 days at 5,280 miles, the ark, by the rules of navigation, must have made a westward departure from her original position, equal to at least 80 degrees of longitude; and if from the mountain that now bears the name of Ararat—assumed as the final station—the distance traversed be retraced over the plains of

Asia, following the course of the currents, the conclusion seems irresistible, as the most reasonable and compatible with all the facts, that Noeville, or the original site of the ark, must have been situated not far on either side from the 20th parallel of latitude, in the present Pacific ocean, eastward from the volcanic island of Formosa, or the still more volcanic Philippine group, both of which, during the forty days, undoubtedly presented to the eyes of Noah, in their fountains of the deep, the most abundant manifestation of their overwhelming powers. The result of this investigation is sufficiently exact and precise to amount to an actual demonstration; and, whilst it thoroughly explains the description of the flood, leaves no room whatever to doubt that the several facts detailed in Noah's journal were actually witnessed by him, and are truly recorded as they occurred.

If the reader will fully familiarize himself with the several features of the foregoing account of the voyage, he will confess that it presents an array of circumstantial testimony absolutely irresistible. The ark, starting within the 24th degree of north latitude, would be borne westward by the great equatorial river, aided by the ever attendant trade winds. The accumulation of waters from the south would force the course of the whole current, with the ark, north of its usual limits, and, after passing the Ghauts, this northward tendency would be greatly increased, and the waters accelerated in their speed, by the retaining sides of the Himalaya chain. On reaching Persia, the humbler summits of Caucasus and Taurus, between the Caspian and the Black seas, would nat-

urally invite the compressed waters to seek an outlet over the Armenian plateau, whilst the Zagros chain upon the west would, by diverting the entire current, or throwing off a lateral branch in the same direction, inevitably take the ark to her final destination, but beyond the usual limit of the ocean current as it is at present. This statement of a surprising and unlooked for fact, being fully sustained, affords convincing proof of the absolute verity of the sacred page. That such were the effects of the mountain chains and the course of the waters, in Noah's day, will be denied by none; for the very same would occur again to-day, were Asia sunken so far beneath the ocean that the summits of Taurus should be covered to the depth of only fifteen cubits, or even more than that.

It is proper that we should observe, that when crossing the 30th parallel of latitude, the ark would probably lose the impulsive force of the easterly winds, and yet her speed would be but little if any diminished. The unusual heating of the waters by the sub-marine volcanoes, their accumulation from the south, and their compression between converging mountains, in a space constantly contracting, aided by tidal influences, would more than compensate for their loss. And it may be further suggested, as highly probable, that the crowning heights of Himalaya were actually above the water, as the ark passed over the region known as India, but were unseen by Noah, and therefore not mentioned in his journal; and we may rest assured that, from their surpassing altitude, they were really so, long before the termination of the voyage. The ark was elevated but 22½ feet above the universal ocean, and from that height the extent of

view would be limited to the distance of six miles, and objects beyond could only be seen at all by standing above the horizon, in proportion to their distance. A mountain 12 miles off, 22½ feet high, would barely reach the horizontal line, and therefore would be imperceptible, and, if a mile in height, would be unseen at the distance of 89 miles, for the same reason.

With the features of physical geography fresh before us, we are now fully prepared to understand why the "waters returned from off the earth continually;" and only *abated* after the end of the 150 days.

Whether the ark reposed on the mountains of Armenia, or others to the east, so long as Caucasus, Taurus and the Zagros chain remained beneath the surface, so long would the currents continue to flow in the same unvaried direction. But as these mountains, at the end of the 150 days, were only fifteen cubits beneath the surface, and the earth was gradually and regularly rising, soon thereafter would their summits emerge from the deep, and constitute a continuous dam from the Persian Gulf, entirely around Armenia to the Hindoo Koosh. Thus checked and hemmed in on every side, the currents would entirely cease to run; but before their final stoppage, they would gradually abate in their velocity and force. Within this circle of mountains the water would still remain, but only as a great gulf, or extended bay, yet without a westerly outlet for the ocean river, and hence it would cease to flow within these bounds. This single circumstance, so simply and unpretendingly introduced, and apparently of but little moment, in this view becomes highly significant and important, as at once pointing to the position of the ark; the

equatorial current, as the medium of her transport; and the influence of existing geographical monuments in controlling the course of the waters.

We have, then, a history of the most remarkable geological event that has ever occurred since the original creation. One who lived upon the ancient earth for 600 years affirms that it was utterly destroyed, and everything on it perished; and that he and his were providentially saved, and in a wonderful manner transferred to new homes in our present world. With an ever watchful eye, he saw, and with a faithful pen recorded the changing scenes presenting themselves, and these incidents are furnished for our consideration. The great leading event is certainly a most surprising and astounding phenomenon, yet standing alone in the chronicles of the earth, our experience does not and cannot enable us either to admit or deny its truth. The mass of facts and incidents, however, accompanying the narrative, compose a web of unusual, irregular and eccentric circumstances, and such as our investigation discloses must have existed if the main fact be true. The very peculiarity of their nature renders it morally impossible that either Noah or Moses could thus have composed a fable, so truly consistent with the eccentricities of the occasion, with the course and speed of wind and wave, with tidal drifts, and the rebounding and accelerating influences of sunken shoals and submarine mountains. Of these matters they could have had no scientific knowledge, and it is absolutely incredible that they could have so ingeniously feigned their facts so closely and thoroughly to resemble truth. The conviction is irresistible,

that the scriptural narration of the universal flood could only have been made by one who was actually a spectator of the scene, and carefully registered in his diary the many incidents as they severally occurred.

The ark ceased to plough the deep upon the 17th day of the 7th month, corresponding to the 27th day of September in our calendar of time, being then arrested in her course by some of the hidden pinnacles of Taurus, or Zagros, then fifteen cubits below the surface. Here she was oppressed with dull monotony in the unvarying scene of water, without an incident worthy of notice, until the first day of the tenth month, December the 10th, when the lookout announces the joyous sight of land, and in his log-book jots it down, that the tops of the mountains are seen; furnishing a fact by which, with an accurate survey, her anchorage may even yet be determined to a reasonable degree of certainty. The residue of our navigator's journal, until the final debarkation, only exhibits to us the gradual declension of the waters, or rather their continual but steady detrusion from the uprising earth, into and within the bounds they finally attained, and still maintain and occupy. At the end of forty days from the sight of land, Noah, wishing to learn the status of the external world beyond the circumference of his limited vision, conceives the idea of an exploring expedition, and to this end, on the 19th day of January, selects from his aviary the raven and the dove, two envoys of diametrically opposite characters, yet each an adept in his own line. The one, guileless and gentle, the em-

bodied pattern of purity, simplicity and love; the other a cunning thief, robber and marauder, and typical of the evil one. For the first an humble dish of seed is an ample bill of fare; whilst the other, less capricious, feeds equally upon roots and fruits, delights in eggs and fish, and voluptuously regales himself with flesh, though putrid in the last degree.

Of the one we sing,

"Come, Holy Spirit, Heavenly Dove,"

And of the other, the poet says,

"Like the sad presaging Raven, that tolls
The sick man's passport, in her hollow beak,
And in the shadow of the silent night,
Doth shake contagion from her sable wings."

The raven from the earliest ages has ever and everywhere been odious to the human family; and his presence and croakings received as ominous of approaching evil. In the days of the soothsayers, when the cries and flights of birds were consulted, as truly foreshadowing coming events, the raven stood proudly pre-eminent as a prophet, and as the most prescient of the clairvoyant race. Although herbivorous before the flood, yet with his vaticinating powers he could not fail to foresee, that soon the time would come when he would be released from such simple and unsatisfactory diet. Preparing for the wished for day, and whilst rehearsing around some carcass the part he would then perform, he, no doubt, had been observed by Noah, and for this reason was selected for the reconnoitering mission.

But the window opens and they both go forth. The dove, taught by nature to stand or rest her foot upon the ground, whilst gathering the diminutive

seeds that lie scattered upon its surface, stands appalled with the extensive waste of waters, the instability of which will not sustain her weight, even if an abundance of food is floating by. Seeing no hope of maintaining herself abroad, she returns to the ark again.

The raven, more strong and daring, and impelled by a ravenous appetite, espies in the distance the mountain tops, and to them he goes, perhaps for fish or flesh. He returns no more, but no doubt, by his protracted absence conveys an answer to Noah as full and replete as if he had reported in person, bearing a bone in his mouth.

Seven days later, January 26th, the dove is sent alone, and she on this occasion flies from island to island, from knoll to cliff and from bank to beach, diligently searching for food, and finally returns with a token for her master. A single olive leaf plucked off is the reward of her labors, and with this in her mouth she returns to her home, indicating thereby, that that was all she could find, and that olive leaves were very unsuitable food for doves. So Noah knew the waters were abated. How and why?

Those who assail the scriptures, find in this little leaf strong support, as they conceive, for scepticism and derision. How is it, in a triumphant tone they ask, that all vegetation is destroyed, and yet this olive leaf is found? A counterfeiter is ever sure of detection in his minor matters and items of less importance. The position assumed is no doubt correct; and if falsehood be certainly detected in even the smallest particular, it should destroy the author's credit. But the converse, too, should be equally

true; and if upon investigation it be found that these unimportant incidents are in perfect harmony with the main narration, that assurance should redound to the author's credit, and the more firmly establish his veracity. It is proper, then, that we should discuss the source of the olive leaf, and Noah's conclusion upon its reception.

Nature's methods of distributing seeds and plants over the various parts of the earth, are not only very numerous, but wonderful even beyond our conception; and to illustrate the subject before us, we cite from Sir Charles Lyell's Principles, some of her varied operations in that line:

"Some birds of the order Passeres devour the seeds of plants in great quantities, which they eject again in very distant places, without destroying their faculty of germination. Thus a flight of larks will fill the cleanest field with a great quantity of various kinds of plants, as the melilot, trefoil, and others, whose seeds are so heavy that the wind is not able to scatter them to any distance. In like manner the blackbird and missel-thrush, when they devour berries in too great quantities, are known to consign them to the earth in an undigested state.

"*Pulpy fruits* serve quadrupeds and birds as food, while their seeds, often hard and indigestible, pass uninjured through their intestines and are deposited far from their original place of growth, in a condition peculiarly fit for vegetation. So well are the farmers in some parts of England aware of this fact, that when they desire to raise a quickset hedge, in the shortest possible time, they feed turkeys with the haws of the common white thorn, and then sow the stones which are ejected in their excrements, whereby they gain an entire year in the growth of the plant. Birds, when they pluck cherries, sloes, and haws, fly away with them to some convenient place, and when they have

devoured the fruit, drop the stone into the ground. Captain Cook, in his account of the volcanic island of Tauna, one of the New Hebrides, makes the following interesting observation: Mr. Foster, in his botanical excursion, this day shot a wild pigeon, in the craw of which was a wild nutmeg. It is easy, therefore, to perceive that birds in their migrations to great distances, and even across seas, may transport seeds to new isles and continents. The sudden deaths to which great numbers of frugivorous birds are annually exposed, must not be omitted as auxiliary to the transportation of seeds to new habitations.

"In considering in the next place the instrumentality of the aqueous agents of dispersion, I cannot do better than cite the words of one of our ablest botanical writers. The mountain stream or torrent washes down to the valley the seeds which may accidentally fall into it, or which it may happen to sweep from its banks, when it suddenly overflows them. The broad and majestic river, winding along the extensive plain, and traversing the continents of the world, conveys to the distance of many hundreds of miles the seeds that may have vegetated at its source. Thus, the southern shores of the Baltic are visited by seeds which grew in the interior of Germany; and the western shores of the Atlantic by seeds that have been generated in the interior of America. Fruits, moreover, indigenous to America and the West Indies, such as that of the mimosa scandens, the cashewnut, and others, have been known to be drifted across the Atlantic by the Gulf Stream, on the western coasts of Europe, in such a state that they might have vegetated, had the climate and soil been favorable. Among these the guilandina bonduc, a leguminous plant, is particularly mentioned as having been raised from a seed found on the west coast of Ireland.

"Sir Haus Sloane states that several kinds of beans cast ashore on the Orkney isles and Ireland, but none of which appear to have naturalized themselves, are

derived from trees which grow in the West Indies, and many of them in Jamaica.

"The absence of liquid matter in the composition of seeds, renders them comparatively insensible to heat and cold, so that they may be carried without detriment, through climates where the plants themselves would instantly perish.

"When, therefore, a strong gale, after blowing violently off the land for a time, dies away, and the seeds alight upon the surface of the water; or wherever the ocean, by eating away the sea-cliffs, throws down into its waves plants which would never otherwise reach the shores, the tides and currents become active instruments in assisting the dissemination of almost all classes of the vegetable kingdom. The pandanus and many others have been distributed in this way over the Pacific."

Thus are presented by the man of science, divers ways by which an olive might be found in a growing state within an extended region, bounded not even by the flight of a bird, nor by the untiring flow of the ocean's currents. Perhaps the raven, for breakfast, had eaten olives before he went abroad, and dropped the seed upon the mountain top. Hard seeds, we are told, passing through the stomach of a bird, are quickened in their germination. Perhaps some other bird from Adamland, soaring over the waste, might have dropped the stone beneath the waters to be upraised and grow. Perhaps some one of the myriads of dead beasts, or birds, or reptiles, that floated upon the flood, was transported to some headland, and there decaying left the olive germ. And perhaps the extirpating havoc of the ancient world may have despatched to distant crag or cliff an olive-tree, with both fruit and leaf to await the call of the dove. It

certainly would be marvellous if not a single one out of a vast multitude were drifted by the waters and found another Ararat to arrest it in its course, and especially so, as that tree from the earliest ages has been indigenously abounding in the neighboring regions. But it is remarkable that it was the olive. Whilst it, in common with most plants, may be propagated from seeds, cuttings, suckers, layers, and by inoculation, it also possesses another and additional method, peculiarly its own, in Italy, called "*uovoli.*" Any obstruction to the flowing of the sap causes small tumours or knots in the wood, which gradually swelling through the bark, form excrescences containing embryo buds. These swell and grow into stem and leaf where situated, or may be detached if required for propagation. It was most probably this "uovoli" process that furnished the shoot from which the dove procured its olive leaf. Fifty-four days have elapsed since the tops of the mountains first were seen, and the seeds themselves, well soaked in the alkaline bath, have had a sufficiency of time to burst the cemented shell and unfold the verdant sprig. True, it was the 26th day of January, the coldest period of our winter, and would appear to be a most unnatural as well as unpropitious season for the germination of the ardent olive. But if the main feature of the narrative be true, the statement of this singular fact presents us with a most expressive instance of that circumstantial testimony, so highly prized in courts of justice. For in the 600th year of Noah's life no winter yet had come to Taurus or Caucasus, neither had perpetual snow seated itself upon Himalaya's brow. They then, themselves were but

growing up from the ocean's bed, and were only isles or islets laved on every side with the *equatorial waters* charged with the heat of summer.

The tropical temperature of eighty-three degrees, transferred to Caucasus, would, even in January, awake the embryo olive from its slumber, quicken its life and invest it with health and vigor. This "leaf plucked off," then, so far from impugning the veracity of the author, is a powerful witness in his behalf. It points clearly to the ocean river as its means of transport, and to its warmed waters, in a wintry latitude and season, as its source of life, and such a record could only have been made by one who was personally present and actually cognizant of the fact.

The objector, then, is fully and sufficiently answered, for the existence of the olive leaf is perfectly compatible with the previous universal destruction; yet he did not read his text very closely, for in that is again affirmed the former wholesale waste. If vegetation were not destroyed, if it still existed, why did not the dove merely descend to the ground and immediately return to the ark with its verdant emblem? When so near by, why gone all day to find it—for it did not reach home until the evening?

"So Noah knew that the waters were abated from off the earth." Not that they were entirely gone, but only diminished in height. How did he reach such a conclusion from the facts recited? Not from the leaf alone, but also because it was evening. The week before, the bird refused to fly, because it could find no place, when seeking its food, to rest its foot upon, but now it finds so many spots uncovered by the

water, that it has been gone all day. It has flown from island to island, from peak to peak, and can only find the olive leaf, and with it she returns to the ark as a testimonial of her labors. An insufficiency of food is yet presented to invite her to stay abroad, and she is constrained longer to depend upon Noah's granary, and thither she wings her way.

Another week elapses, and again, on the 2d of February, the winged scout is despatched abroad, to view and report as to the progress of the earth's uprising. On this occasion, she absents herself entirely, and returns to the ark no more. Now she reports intelligibly, as well to us as to Noah, that the retiring waters have left the earth behind, so well replenished with seeds, that in future she will provide for herself, and even in the dreary solitude enjoy the sweets of liberty. Thus is told us, in the conduct of the raven and the dove, the steady and progressive upheaval of the old ocean's bed, to form a new habitation for the arkite races and their descendants, and these birds are not introduced into the holy writings merely as ornamental figures, after the manner of proficient artists, to enliven the scene, but are in fact hieroglyphic symbols of the highest importance and significance. In a future page, and upon a fuller view of the landscape, their significance will be more vividly seen.

Noah's diary next informs us, that his birth-day having intervened, on the 15th day of March, the first of the new year, he removed the coverings of the ark (probably of cloth or leather), and beheld for himself that the "face of the ground" was dry. Yet for nearly two months longer does he remain immured within

his prison. It is yet early in the season, and his long experience, too, had taught him that specious appearances are often deceptive; and though the surface may seem inviting, yet the substratum, for centuries soaking, may prove a fatal bog to the ponderous creatures committed to his charge. On the 10th day of May, in the year of his life 601, he records that the earth itself, and not the face or surface only, is dry, and then, after an imprisonment of 375 days, the long closed door was opened, and joyously went forth "Noah and his sons and his wife, and his sons' wives with him; every beast, every creeping thing and every fowl, and whatsoever creepeth upon the earth after their kinds, went forth out of the ark."

Landed once more upon the stable earth, and released from the dull monotony of their tedious confinement, dull indeed must be the imagination that cannot conceive how unbounded were the demonstrations of that multifarious host. A perfect jubilee of joy ensues around the base of Ararat; the Armenian plain fairly trembles with every diversity of gambol, prank and romp; the air is perturbed with excessive ærial gyrations, and the glens of Taurus resound with the pæans of praise and thanksgiving that in concert flow from myriads of grateful hearts. The danger is past, freedom and security regained, and with united lung and limb are they vehemently attesting the fervency of their buoyant emotions. But in the very midst of their festivities suddenly silence ensues, pallor and trepidation affix the crowd, and all eyes once more fearfully turn to the ark. A shower is falling and another flood is feared, when the Lord of heaven appears, and, pointing to his iridescent arch

painted on the sky, proclaims: "*I do set* my bow in the cloud, and it shall be for a token of a covenant between me and the earth, and I will remember my covenant, which is between me and you and every living creature of all flesh; and the waters shall no more become a flood to destroy all flesh."

The Almighty Being who planned the ark, and happily guided it through his own destructive flood, gave that pledge, and with it indelibly stamped upon the hearts of all his creatures the most implicit confidence in its sanctity. Since the "bow in the cloud" appeared, none has feared a coming flood, nor has even its possibility at all disturbed the hearts of men.

But the voyage is ended; the day is over, supper dispensed to all, and the songster of the night gaily chants the vesper lullaby with his tyr-whit-tyr-whit-too-who, and all the weary travelers seek repose upon the dry sea grass, with hearts in unison, bounding and glowing with deep and fervent gratitude to God for the Great Deliverance.

CHAPTER XII.

REIGN OF CONFUSION.

"May ye never play in tune,
In the morning, night or noon;
May you never, at noon or night,
Know the wrong end from the right;
May the strings be ever breaking:
Pegs! I charge ye, ne'er unscrew;
May your heads be always aching
'Till the fiddle's broke in two."

COMMENCING with the beginning of our Comet's life, we have watched her in her infancy, followed her through her youthful years, and finally seen her pass through one of those metamorphic changes that invariably pertain to the lives and natures of all created things. In every stage, and in all her characteristics, she has disclosed a strict submission to physical laws, and that she is, in very fact, a creature. Our guide-book, too, with its labyrinthine thread and brief notations, has safely led us through the misty mazes of the mysterious past, and finally opened to us the light and truth. But the world has changed immensely, and so, too, must our guide-book change, to enjoy our abiding confidence. Order, method and symmetry have given way to disorder and complexity; and shall our guide conform thereto, we may most implicitly trust it for the future.

Scarcely do our ancient immigrants from the rainless world land upon our rugged and distorted earth,

before they are discourteously saluted with a copious shower; and, to allay the fears excited by so strange a phenomenon, the rainbow—equally as strange and unknown—is adopted as the abiding token of a covenant between God and man and all minor creatures.

To provide for the degeneracy of food, that is naturally and necessarily to ensue from a change of contrasted worlds, the antediluvian herbivorous law is at once repealed, and universal fear and discord must supersede the cordial and catholic amity that existed before the flood. The language used upon the occasion, emphatically affirms, that prior thereto, peace and harmony had fraternized the races; but thenceforth a converse state of antagonisms should mar the social state.

"And God blessed Noah and his sons, and said unto them:

"Be fruitful and multiply and replenish the earth.

"And *the fear* of you, and *the dread* of you, shall be upon every beast of the earth, and upon every fowl of the air, upon all that moveth upon the earth, and upon all the fishes of the sea; into your hand are they delivered.

"Every *moving thing* that *liveth* shall be *meat* for you; *even* as the *green herb* have I given you all things."

As the coming necessity, springing from an altered and degenerate world, required a compensation for the loss of the rich glutinous and nutritious herbs of the Adamland, that furnished at once both bread and meat, permission in advance is given to the human race to make use of animal food. But it is further unfolded to us by the sacred writer, that man did not exercise the privilege thus conferred upon him im-

mediately, but deferred it for more than a century thereafter. During this period, man and beast continued to dwell in peace, as before the flood, to increase and multiply; yet awaiting the day when bloody strife should commence its reign upon post-diluvian earth.

In the interim, we are advised that Noah, as a man of foresight and practical prudence, has come prepared with all things necessary to his changed condition. He becomes a husbandman, and plants a vineyard; and, of course, we must understand that he has brought his vines and seeds, his farming tools and implements. And here, again, it is in another form announced that all former vegetation was destroyed; and for the want of building timber, Noah and his sons are represented, for eight years at least, until Canaan, Ham's fourth son, was born, as living in tents. They were then abiding in the land of Ararat, modern Armenia, a country from Moses' day till now most abundantly supplied with cypress and juniper, beech, birch, oak, walnut, mulberry, all manner of firs and pines, and with the Cedar of Lebanon proudly towering over the site of the ark itself. That they had their tools and knew their use, Babel soon discloses; and that their condition was neither intolerable nor uncomfortable, the Arab on the south, and Turkistan on the grassy plains of the north, both affirm; for they do now, and have ever lived in tents, for the want of timber.

Our author here imparts and records a useful and profound physiological truth; that to even a sudden change in the conditions surrounding life, the animal frame and being does not instantly and at once con-

form, but several successive generations are requisite to secure a full and perfect adaptation. Man after the flood is exhibited in a transition state, passing from his ancient form and lengthened life to our diminished stature and contracted span. In Abraham's genealogy from Noah, this physical law is well illustrated. Noah, with his antediluvian constitution and well-set frame, lives out his allotted term of 950 years. Shem, with less of the ancient impress than his father, yet possesses enough of the pristine vigor to reach 600 years, and outlive his son and grandson, both born this side of the flood.

Arphaxad lived . . .	433	years
Salah, his son, ...	433	"
Eber	464	"
Peleg	239	"
Reu	239	"
Serug	230	"
Nahor	148	"
Terah	205	"

and Abraham at 175, is recorded to have "died in a good old age, an old man and full of years." Isaac lived to the age of 180, and Jacob died at 147. "Moses was 120 years old when he died; his eye was not dim, nor his natural force abated." Throughout this transition period, we find a steady but regular and slow declension of vital power, proclaiming the law that rules in constitutional changes. It is worthy to be observed in this connection, that Noah and Abraham were contemporaries, the former dying when the latter was sixty years in age; and that Shem was coeval with his lineal descendants, Isaac and Jacob, by and through whom these accounts of the olden

time were preserved, and have been transmitted down to our day.

After a full century has passed away, and man and beast have multiplied upon the earth, the Lord proceeds to the completion of his purpose, manifested and begun in the destruction of the Adamland. "And it came to pass, as they journeyed from the East, that they found a plain, in the land of Shinar, and they dwelt there."

Fortunate were they, indeed, thus to *find a plain* in this disfigured and disjointed world of ours, and it is exceeding strange that neither Shem, Ham nor Japhet recognized it as the ancient garden of Eden, for they were present and participated in the discovery. They certainly were more obtuse than our modern savans, who, captivated by a single river's name, the Euphrates, positively hold that here upon its banks mother Eve first rocked an infant's cradle, and nurtured a numerous progeny. With like consistency too, it is also urged, that in the same vicinity Noah built his ark, which most unaccountably reached the Armenian heights upon the north, whilst the waters were continually flowing down the mountains to run from off the earth. If these conjectures be well founded, it is really marvellous, that now the third great event in human history is to occur upon the self-same spot, and those perfectly familiar with the distinguished region, can remain wholly unconscious of its sanctity and renown. Patent must be the fact, that the original sites of Eden and the ark both lie buried beneath the ocean's waters, whilst Babel becomes the modern centre from which mankind begins anew.

Whilst dwelling in Shinar, these sons of Noah, we learn, continue still, as their relations were before the flood, a homogeneous people, a unit in thought and feeling, and all speaking a common tongue. Few in numbers, but animated by a similar spirit, they felt that their giant arms combined could accomplish daring deeds, deeds of "might and renown," such as their ancient relatives had wrought in the glorious Adamland, the memory of which had come down to them, and even descended to Moses' day.

"Go to, they said one to another, let us make brick and burn them thoroughly. And they had brick for stone, and slime had they for mortar. And they said, go to, let us build us a city and a tower, whose top may reach to heaven; and let us make us a name, lest we be scattered abroad upon the face of the whole earth."

The disposition thus early exhibited to renew the scenes of the former world, to establish their supreme dominion over the earth as *theirs*, and to exercise their gifts for themselves and their name alone, and to perpetuate their power and independence through all coming time, did not escape their Maker. The Lord "beholding, that the people *is one*, and they have all *one language;* and this they *begin* to do; and now nothing will be restrained from them which they have imagined to do," determined at once to remodel mankind, and in the place of that unity of feeling and speech, which induced depravity and blindness of heart, he established a diversity of tongues, and thus scattered them from thence abroad upon the face of all the earth.

"All fell to work, both man and child,
Some howkit clay, some burnt the tyld.
Nimron, that curious champion,
Deviser was of that dungeon.
Nathing they spared their labours,
Like busy bees upon the flowers,
Or emmets travelling into June;
Some under wrocht, and some aboon,
With strang ingenious masonry,
Upward their wark did fortify.
The land about was fair and plain,
And it rase like ane heich monetane.
Those fulish people did intend,
That till the heaven it should ascend;
Sae great ane strength was never seen,
Into the warld with men's een.
The wallis of that wark they made,
Twa and fifty fathom braid;
Ane fathom then, as some men says,
Micht been twa fathom in our days;
Ane man was then of mair stature
Nor twa be now, of this be sure.
* * * * * * *
Then the great God omnipotent,
To whom all things been present,
He see and the ambition
And the prideful presumption,
How thir proud people did pretend,
Up through the heavens till ascend,
Sic languages on them he laid,
That nane wist what ane other said;
Where was but ane language afore,
God send them languages three score;
Afore that time all spak Hebrew,
Then some began, for to speak Grew,
Some Dutch, some language Saracen,
And some began to speak Latin.
The maister gan to ga wild,
Cryand for trees, they brocht them tyld.
Some said, bring mortar here at ance,

Then brocht they to them stocks and stanes;
And Nimrod, their great champion,
Ran ragand like ane wild lion,
Menacing them with words rude,
But never ane word they understood.
——— for final conclusion,
Constrained were they for till depart,
Ilk company in ane sundry airt.

The Monarchie, DAVID LINDSAY.

By a confusion of tongues we should not understand simply a change of words or language, but a corresponding change of temperament, else the original unity is not entirely altered. Temperaments in our day are as various as climates, induced, some of the learned say, by diversities of food. Words are but the reflections of our sensations and perceptions, the symbols of our ideas; and as the substances differ, so must their lights and shadows. Man is a harp of a thousand strings. In the Adamland with its uniformities, the harp kept ever in tune and gave a certain and steady sound. Now, amid ever changing and varying climates, the strings no longer vibrate in unison, its notes are discordant and unharmonious, and its tones jarring and grating. Hence, with a diversity of peoples exhibiting different temperaments, we find a corresponding variety of tongues. Men will invent and use terms in sympathy with their feelings; and these will represent the degrees of intensity with which they are respectively impressed. To illustrate, we will suppose the author shall make his statement as published in "the Types of Mankind," to a select company of men with different temperaments. He tells them that he has procured from the banks of the Mississippi, near New

Orleans, a human skull, and that the type of the cranium, as might be expected, proves conclusively that it belonged to the aboriginal American race; and that from certain stumps of trees lying in the mud above it he is enabled positively to affirm that the human race existed on the Mississippi more than 57,000 years ago, and an exuberant flora of cypress trees adorned its banks 100,000 years before that time; so that beyond all question, the great river, for 1500 centuries past, has laved its shores with its turbid waters.

To such a statement we may readily imagine, a gruff son of Britain will exclaim, "Lie, sir, lie."

A Frenchman with a shrug, "Oui Monsieur."

A Roman, "Credat Judæus. Tell it to the Jew."

A Hoosier. "Ah, sir, you've traveled."

And kind Uncle Toby, with his amiable lillabullero, would simply respond with a "whe-e-e-u."

This illustration is really what occurs in the fields of nature, giving rise to idioms, dialects and languages. The very same matter, stated in the same words and in the same way, does not affect the different parties with the same intensity, and hence their responses and their language vary, indicating the degree of their several impressions. The confusion of tongues was, no doubt, greatly accelerated in the earliest ages, when society chiefly consisted of patriarchal tribes and families. Each household and village would naturally invent and use new and peculiar words and phrases, the more effectuallly to muffle their plans and purposes, and secrete them from their hostile neighbors. Such seems eminently to have been the case with the aboriginal tribes of

the American continent. John Lawson, who, as the surveyor general of North Carolina in the provincial times, enjoyed the opportunity of becoming intimately acquainted with the natives, in his unique history of that State asserts that no two tribes used the same word to express the same meaning; and that even the younger members of the tribe were often unable to comprehend the abbreviated and mystical terms of their sires, when engaged in their serious debates in council.

The same disposition is evinced by burglars, thieves and pickpockets, in the very midst of crowded cities, as they invariably possess a jargon peculiar to their fraternity, and wholly unintelligible to common ears.

This great change of temperament and confusion of tongues had their origin at Babel.* It was there that the pebble was first thrown upon the waters, and from thence the wave engendered has spread its ripple to the very confines of earth. Up to that time, man had been one, a unit; but at the base of the giant tower a heterogeneous nature was imparted with repellant powers to drive peoples asunder, and thus give rise to differing nationalities. Thereafter universal antagonism prevails and wars ensue. Before the flood there were no such desolating wars as commentators conceive and lamentingly suggest.

* Bab, Babel, Baby, in the ancient tongue, according to Sir Charles Hamilton Smith, signify *giant*. That we here find the root of "Babble," is both manifest and significant; and if the modern "baby" can trace its appellative to the ancient tower, it clearly proves for what enduring time the scent of the rose may linger around the vase.

There are sins enough in the catalogue to provoke the Almighty's wrath without resort to such a conception. Violence and corruption, in their harshest form, were manifested in Sodom and Gomorrah, and they, as Adamland, were punished by submersion beneath the briny waters of Asphaltites. In the enumeration of the sinful works of the flesh, war is not so much as mentioned. Wars are of postdiluvian origin, and spring from nationalities; from broken treaties, leagues and covenants; from dissensions between kingdoms, empires and states. They are designed for man's correction; to humble his haughty pride, to reduce him to submission, and to punish his manifold and persistent wickedness are rods of chastisement in the Almighty's hand. "HE is the king of glory, the Lord mighty in battle, who mustereth his hosts either of men or minor creatures, Assyrians or palmer worms, to teach his creatures that in the midst of their supremacy there is a Being yet more exalted and potential than they, who overruleth all their plans, and demands their recognition. No sooner does a nation, inflated by its achievements, begin to swell and vaunt itself in the pageantry of its glory, than some Goth or Vandal comes to convert its pompous trophies, pillars and triumphal arches, into sepulchral monuments of its memory. A brilliant son of Mars discovered and proclaimed that the Lord was on his side who manned the heaviest artillery; and yet, in humility, he closed his days on St. Helena without a pocket pistol.

These ethnological differences and antagonistic influences were introduced at Babel, as a "system of checks and balances"—as the numismatic gentlemen

would say—to keep the races in the path of duty and remind them that when they feel that they most surely stand, that then they will most surely fall. "The people that doth not understand shall fall," saith the Lord of Hosts; and he who maketh the winds his messengers, and the electric fires his ministers, established the law in Nimrod's day, for his kingdom began at Babel. In this regard, again, we find another contrast between the ancient world and ours.

The lesson inculcated at Babel would seem strictly to teach that the races, thus separated and repelled by the confusion of tongues, it was God's purpose should ever live and remain apart; that those whom He hath put asunder, man may not lawfully join together. Shem has ever exhibited a pacific turn of mind, indisposed to sanguinary affrays, and averse from brutal ferocity and truculency. Ham has always shown a relish for blood, but only in a limited way, and in fractional quantities at a time. He readily kills his fellow-man, and may perchance occasionally rise to the dignity of a caravan. But Japhet is that son of Noah who truly delights in blood. For the ways even of Ham he evinces the most profound contempt, and the killing of a single man he pronounces murder, and will hang the offender for his petty conduct. But when from the battle-field of greatest slaughter—no matter for what—the conquering hero comes, all covered over with blood and glory, him he deifies at once and worships.

Hence Abraham, well knowing these distinctive and innate traits of character, could well foretell that Ishmael would prove a wild man, with his hand continually uplifted against his fellow, for in his blood

was flowing the discordant elements engendered by a cross of Shem and Ham. To the distant East he sent to procure a daughter from the stem of Shem for Isaac's wife; thither, too, did Jacob go for wives, although Ham's daughters were abundant on every side around them. Moses well understood this law of Babel, and engrafted it as a principle in the Jewish constitution, that marriages with strangers were forever prohibited, and that it were even better to slay than intermarry with the surrounding daughters of Ham. Solomon, violating the plain decree, left the kingdom, which with him had attained the highest pinnacle of glory, to fall at once to pieces in the discordant hands of his mongrel sons. In America, too, to-day, without looking farther off or back, the nations still attest the effervescing tendency of different bloods commingled. In the Southern Republics, Portuguese and Spaniard, red man and negro, are all combined, and there bloody revolution keeps its perpetual round. In Mexico, we find saltpetre-white, sulphur-yellow and charcoal-black thoroughly blended together, and it is no wonder that there should be a living, moving mass of powder.

As the members of the vegetable and animal kingdoms have, in the different regions of the earth, multiplied in modified forms, and presented many species; so, too, with man, have these three distinct temperaments, when scattered amidst the diverse climates of the earth, exhibited many modifications; giving rise to what is termed "national characteristics." To mingle these discordant elements together, with the hope of forming a pacific people, or a homogeneous and enduring nation, is contrary to what now

may be deemed the law of nature. Time cannot deface the inequalities and harmonize the discordant elements, for it is only through many and successive generations that great and radical changes are effected, and before time accomplishes the work, they, like alkali and acid, must tumultuously effervesce, before they can commingle. This law of antagonistic hostility between the members of the human family, is affirmed not only by sacred but profane history on every page from Babel's day till now.

Having considered the state of man, we next review the lower orders. Up to the date of the great confusion, we find the beast, the bird and the reptile, yet abiding by the ancient law, living in amity with each other, and without the "fear or dread" of man. The date of their discomfiture is expressly fixed at Babel, in the recital of a fact which otherwise would be too trivial to find a place in the condensed page of sacred history. Nimrod "*began*" to chase them, and became a mighty hunter before the Lord. He infused into them that fear and dread, which riotously drove them back upon each other, involved their harmonious ranks in complete disorder, and provoked an endless war of all the races. They, recalcitrating, take up arms in their own defence. Not only man, but all that he claims as his, are continually subjected to their assaults. As if by common concert, and to the utmost of their ability, do they incessantly labor to disturb his ease, destroy his gains, add uncertainty to his hopes, and mar his plans in life. The lion has taken the bullock, the tiger has caught the kid, the wolf has eaten the lamb, the bear has destroyed the pig, the bull has gored the horse, the

colt has kicked the calf, the fox has caught the goose, the mink has demolished the roost, the hawk has caught the hen, the pike has swallowed the gosling, the alligator has taken the hound, the puppy is sucking eggs, the chiego is in the foot: the bee has stung the baby, and these mosquitoes are very, very bad, are but a few of the laments continually heard by suffering man. This spirit of hostility commenced in Nimrod's day, and the beginning of his kingdom was at Babel.

But the reign of confusion is not confined within these limits, for its rule is co-extensive with the whole globe.

In the vegetable world, equally with the animal, is the belligerent temper visibly exhibited between its various members. The great and powerful oppress and banish from their realms those more feeble, and by overshadowing the weak, kill and convert them into food for their hydra-headed mouths. In retaliation, the mosses and the lichens, vampyre-like, affix themselves to their bodies, and batten upon their juices, whilst the parasitic ivy and mistletoe more fiercely implant their bills well within their limbs, the more effectually to feast upon their vitals. The great monarchs of the forest, the sturdy oak, and graceful elm, often find an insidious foe in the luxuriant vine, that gradually entwines itself around their forms, but only, as the anaconda, to crush out their lives, in the compressions of its hostile folds.

Even the different regions of the earth itself, as we have before described, are continually warring upon each other. The mountain and adjoining desert, the lands of flood and drought, the scorching heat

and freezing cold, the intense light, contrasted with perpetual shade — all bespeak their antagonistic struggles.

The ocean, too, with its depths and shallows, with its continents and islands, combining to produce as great an inconstancy of climate as the land itself endures, presents, with its ever varying currents, its angry surges and tempestuous billows, unmistakable proofs of the contentious spirit that rules its different regions. With the atmosphere around it, its furious conflicts are unceasing; and even the land proclaims its malignant spleen, in the many destroying floods it wilfully hurls upon it.

The tenants of the deep by no means escape the law of antagonisms, but acknowledge the fullest subjection to its force. No longer ganoid, as of old, they now are armed with the most varied and perfect implements of bloody warfare. Teeth, long and sharp, curved and straight, and even several rows in depth, indicate the martial equipment of some, whilst others are provided with lengthened swords, with doubly indented saws, and even with rasps and gimblets for piercing molluscous cases, as weapons of destruction. Some take their prey singly with galvanic batteries; some, with a stunning fluid, paralyze their game; and others, more antagonistically endowed, with cavernous mouths, opened wide, devour whole schools of smaller fry at a single meal. Whilst thus fiercely does the war-cry ring between the members of the watery world, it is yet intensified by the untiring assaults upon them all, by man and beast, bird and reptile. These combined powers, with myriads of natural weapons and artificial devices, continually

invade the sea and take captive its inhabitants and immolate them as sacrifices to appease their own predacious natures.

Even in the air that envelopes us, do we plainly discover the same bellicose nature. Strife there reigns pre-eminently; the winds are unanimously charged with an inconstancy that indicates their restless temper. The hurricane and tornado, the simoom and typhoon, are but occasional symbols of its angry moods, which men, at times, are forced to feel; but daily, when one ærial current meets another, does he discern the fierce and angry contest that ensues in the fiery lightning that they flash into each other's sides, accompanied with their roars of booming thunder, resounding throughout the heavens.

Thus the whole globe, and all its parts and members, are clearly seen in the militant state. Man alone does not wield the battle-axe, or stamp the grim-visaged emblems upon his armorial bearings, but the war-whoop sounds throughout the broadest bounds of earth, and its notes are honored by all—the small and great alike, as well by the inanimate as by the thing of life. How plainly stands affirmed the truth revealed, that every creature and all creation groaneth and travaileth together in one universal state of bondage, yet earnestly looking for the coming of a future day, with the glory of which the sufferings of the present time are utterly unworthy of comparison.

And thus must it continue until that joyous day arrives, the advent of which is postponed until the times of the Gentiles shall be fulfilled. But who are the Gentiles? Scripture—ever her own best inter-

preter—answers, that by Japhet and his sons were the isles of the Gentiles divided and peopled. These, then, are the days of Japhet—that Japhet who, from Nimrod's day till now, has, with sword in one hand and torch in the other, been roaming over the earth, and fulfilling his destiny, as he himself most proudly affirms, in extending the blessings of his enlightened civilization to and amongst all his less favored brethren. Such blessings as Assyria and Chaldæa, Palestine and Syria, attest; the same, that the once scientific, learned and happy Egyptian now enjoys, with his prostrate neck beneath the civilizing heel; the same that Peru and Mexico have been compelled to accept, as substitutes for that they formerly had and with which they were happy, prosperous and content; the same that Hungary and Ireland know, and the Southern States of the American Union are inevitably doomed to experience. The system and success of this civilizing process are plainly written on every scarlet page of Japhet's history, announcing the numbers of his slain and wounded, the smouldering ashes of cities burned, and the demolition and devastation of states, empires and nations.

Whilst his studios and museums have long been illustrated with artistic trophies, despoiled from classic ground, he would now fain seek, beneath the ancient rubbish, Nimroud tables and Rosetta stones, as unerring witnesses of his former folly. Truly are these the times of sanguinary and destroying Japhet, and, until they be fulfilled, peace cannot abide on earth. But his sands are nearly run; the exhausting effects of continual wars have greatly impaired his powers, and the strength and wealth of unborn gen-

erations have been expended in bloody strife. Every nation that bears the stamp of Japhet is utterly insolvent; and already does the rustic pruning-hook begin to unfold seductive charms and claim an equal dignity with the polished sword. These are the times of Japhet—yea of Japhet and that arch-fellow, that, in walking to and fro in the earth, stepped into church in Job's day.

These are the times of Japhet and the devil; and when they both cease to roam the earth as roaring lions, seeking whom they may devour, then the change will come. Then, and in that day, will the sceptre pass from the bloody grasp of Japhet to the pacific hands of Shem.

CHAPTER XIII.

RETROSPECTIVE SUGGESTIONS.

"A perfect judge will read each work of wit
With the same spirit that its author writ."—POPE.

THE admonition of our history, when rightfully examined, is extremely simple, unequivocal and significant, and well unfolds the true position of man and his relation to his God. The opening scenes of life exhibit to us a graduated scale of beings, in regular and successive order, springing into existence all dressed in robes of clay. Last of all comes man, he, too, clad with earthy vestments, and differing from

his predecessors, not in the amount of dust composing his body, but in the measure of that breath divine that made him a living soul. All were endowed with the faculty of perpetuating their own kinds, to preserve continuously the harmonious relation of the different members of this first established system. Each had its own end, its own duty to fulfill, its own functions to perform, in the grand scheme of life; and to each was imparted a sufficiency, and no more, of mental and moral endowment, of instinct and reason, to enable it effectually to accomplish its design and purpose. Revelation teaches, and man's reason affirms, that there are also other beings higher in the order of creation than himself, who, in etherial robes, continue the gradation even to the threshold of the eternal throne. Yet there is only one Omniscient Being, and none, save One, is perfect. All the rest below are the finite and limited subjects of the Almighty Sovereign. As it is with man, so too it is with the other orders. Each fitted to its sphere may, with its adjusted vision, see and clearly comprehend those matters suited to its grade, and then, with the vanishing point of its perspective, behold others fading away from sight, with undistinguishable outlines, so enticing as to provoke a strong desire for a brighter light and more distinctive coloring. Each may see, darkly and dimly, as through a glass, things that are plainly visible and familiar to those of a higher degree; and yet man is not content with his meed of these allotted gifts, and fain would have more. He complains that he is unable to answer his own inordinate interrogatories. Why he was made at all—why so subject to pains and infirmities—and why, by the

Omniscient and Omnipotent was he not made whole and perfect at once, without sin or evil in the world to continually disturb his peace? He forgets that if man were differently and more highly endowed than he is, he would not be man at all; and that this link in the great chain of life would be wholly wanting, and the plan of Almighty Wisdom marred, merely to gratify the impertinent curiosity of the creature, whose elevation to a higher sphere would, instead of satisfying, only unfold other unfathomable mysteries, requiring a further bestowal of gifts for their solution. As additional light and knowledge could only serve continually to excite a thirst for more, even until the extreme limit of Omniscience itself was reached, it is certainly most proper that boundaries should be, as they are, prescribed, to the several grades of beings. With these limits as required, they should rest content, feeling assured that benignant wisdom has most happily arranged and duly apportioned them all amongst his creatures, according to their several capacities and responsibilities.

Thus was man created in the beginning, at the summit of the terrestrial races, but with a body so composed of aggregated earthy atoms, as naturally and necessarily urge it continually to lust and war against the spirit. At the very outset, Adam and Eve, whilst entrusted with supreme dominion, were informed of their own imperfection, the danger that beset their high position, the limits by which they were bounded, and the consequences of their transgression. Their first home, a perfect paradise of physical pleasure, a garden planned and prepared by the Almighty's artistic hand, afforded on every side all

that could please the eye, delight the taste, and gratify the senses. Neither pang nor pain, nor harrowing care, neither bitter gall nor thorn nor bramble was there existing to ruffle the even raptures of their lives. Labor for existence was not exacted, nor were they required to perplex themselves with anxious thought. God proffered to think for them, solve all their doubts, define the choice between good and evil, and decide the right and wrong. Elated with his dominion and position, he becomes restless and dissatisfied with the restraining limits of his high and happy lot, and seeks to attain a broader sphere. Yielding to the tempter's voice, in an evil hour his Maker's admonitions are forgotten and disregarded, his proffered guidance presumptuously spurned, and he oversteps the periphery of man's degree, and offends and falls. This state of enchantment proved too exalted and perfect for the imperfect puisne creature, and as his disobedience in that fully disclosed an unfitness for a higher sphere, he was degraded to one more suitable to his nature.

Cast into the fields in this second lower state, labor is all that is demanded at his hands, and the sweat of his countenance brings its sure reward. Harmony prevails in all the ways of nature, and no storms of wind occur to blast his hopes, nor parching drought or drenching rain to perplex him with uncertainty. Absolute and unvarying success crown all his efforts, and ease, peace, and plenty are surely his, according to the measure of his exertions. Yet thus highly favored with inestimable gifts, in the midst of such manifest tokens of his Maker's love, he entirely forgets the Author of them all, ignores all dependence

upon a superior power, claims the full meed of merit as his own, and is again condemned for his presumption.

The first earth, then, with all its pacific and blissful unities, is by the unerring Judge, in the ears of man pronounced corrupt and corrupting, and, therefore, unsuited to the infirmities of his wayward nature. To remove both cause and effect at once, in the fierceness of his wrath the Almighty hurls the offending earth beneath the briny waters, and splashes up from thence the present world, a jumble and disorder.

Hence its contrasts and anomalies, its antithesis to the world departed. The present, as a schoolmaster, stands to prepare and qualify the headstrong race for that future state of being, where implicit obedience to the Sovereign's will is requisite to insure the highest happiness. Its different reliefs and forms, its coasts, its zones parted into diverse and opposing kingdoms, by lakes, rivers, oceans, deserts, and mountains, with a conflict in all its elements, no longer permit unity of language, thought, and feeling, but incite antagonistic temperaments with attendant feud and strife, and continually provoke the race to bloody encounters and the incessant clash of arms. Man, here, in every hour of his existence, is reminded by the capricious uncertainties which surround him, that he is neither omnipotent nor immortal, but wholly dependent upon a higher and overruling power. Here he has well and thoroughly learned, that though he may plant and water, yet it is from his God that the increase comes; and deeply impressed, he is taught to feel and say, "If I ascend up into

heaven, thou art there; if I make my bed in hell, behold thou art there; if I take the wings of the morning, and dwell in the uttermost parts of the sea, even there shall thy hand lead me, and thy right hand shall hold me; if I say, surely the darkness shall cover me, even the night shall be light about me." If in all our manifold trials, troubles, and vexations, we find the tokens of an angry God's displeasure, we also feel them just and well deserved, and should receive them as they are intended, as mementos of our frailty and of a tender father's love. To him upon our knees we come to deprecate the ills of life, and to him we also turn to procure its greatest blessings. He will not always chide, neither will he keep his anger forever. His ways are not as our ways, nor his thoughts as our thoughts; but *His* ways are ways of pleasantness, and all *His* paths are peace.

CHAPTER XIV.

CONFIRMATION.

High hung at either end, and next the wall,
Two ancient mirrors show the form of all.—CRABBE.

ABOUT eighteen hundred years ago, in a portion of the world then but little known, and where known but little esteemed, there lived a fisherman. Though plain and unlettered, he was yet a man of good, hard, practical understanding, of great firmness of purpose

and decision of character, and withal possessed such natural sagacity that he skillfully baffled the "Old Boy" himself, who ardently desired to sift him as wheat. He was elected as one of a dozen, by whose simplicity and lowliness the things of this world called mighty, as well as the wisdom of the wise, might be confounded. He acquired the cognomen of Stone or Rock, from the proficiency he exhibited in laying the rocky foundations of a fabric that was destined and intended to cover the earth entirely over. The better to qualify himself for so gigantic a work, and to raise a superstructure upon a base that would withstand the shocks of ages, resist all attempts to undermine it, and defy even the gates of the grave, and the all consuming jaws of death itself, he deeply studied the venerable chronicles of the oldest times, to ascertain how the earth was made, and the varying casualties to which it would be subjected. The Book of Genesis furnished him the knowledge he desired, and from its narration, plain when carefully examined, he drew his own conclusions. These he communicated to some of his inquiring friends, and by way of confirmation, presented his thoughts in the form of a double mirror, reflecting distinct images on the two opposite sides; the one backwards to the flood, and the other forwards to our own times. Peter's mirror, as an optical instrument, is far more perfect than Herschel's great reflector, and when attentively considered, is truly a wonderful piece of mechanism. The images reflected are in his own language described as follows:

"Knowing this first, that there shall come in the *last days*, scoffers, walking after their own lusts

And saying, 'Where is the promise of his coming? for since the fathers fell asleep, *all things continue as they were from the beginning of the creation.*'

For this they *willingly* are ignorant of, that by the word of God, the heavens were of old, and the earth, standing out of the water, and in the water;

Whereby the *world that then* was, being overflowed with water, *perished;*

But the heavens and the earth, *which are now*, by the same Word are kept in store, reserved unto fire against the day of judgment and perdition of ungodly men."

This is Peter's mirror, one side of it reflecting Noah in his ark, flying from a world destroyed by overflowing waters, to another world that now stands, but only reserved for a day of all consuming fire; the other exhibiting with perfect fidelity certain philosophic schools of these last days, who, following their own lustful conceits, persistently assert, that as the earth now stands, so has it stood from the first dawn of incipient life. The geologist can discern no traces of an universal flood, but can readily number in his Silurian, Devonian and Carboniferous systems, the immensity of years that constitute each of his several eras; and from the fossils exhumed from the layers of the present earth, precisely define when the first vital breath was drawn, and the protracted ages that must have elapsed in the successive creation of the higher organic forms. The genesis of life with him begins on the earth as it now stands, and this because "he is willingly ignorant that the world that then was, perished."

So, too, the philosophers who affirm, that whatever plants or animals they choose to designate as species must be accepted as separate and distinct creations,

retaining substantially the parts and forms their progenitors received in the very beginning; and as a necessary consequence of this dogma, that man and all the varied fauna and flora of the earth were made and placed in certain numerous specific centres, within the bounds of which they have closely remained and preserved their identity from the beginning. This they all affirm, because "they are willingly ignorant that the world that then was, perished."

If the apostle's mirror reflects as truly backward as it does in this direction, then its description of the flood must be accurate in the extreme; and no doubt can be entertained as to the former existence of the Adamland, and its last unhappy fate.

PART SECOND.

INTRODUCTORY.

In the previous part of this volume, we have presented to the reader a view of the primitive world, from its inception to its overthrow, and turned the first leaf in the postdiluvian volume. In doing so, we have solely relied upon the sacred author, Moses, and only accorded to him the same consideration that Manetho, Berosus, or other ancient historian would be entitled to claim. No stress was laid upon the work as one of Divine authority, but as a simple history all its brief statements were candidly examined, and fairly tested by the light and laws of nature, as they stand revealed to us in our present world. This light and these laws were further and legitimately used, when absolutely necessary to explain the text, and to enable us to reach the author's meaning.

A certain amount of knowledge is necessary to understand the simplest books, and elementary principles must ever be acquired before higher attainments can be mastered. Did we not possess some knowledge of the laws of nature, of

earthquakes and volcanoes, of vegetation and natural history, the Bible as well as the book of nature itself, would be to us intricate riddles, and incomprehensible mysteries. When descriptions are presented to us of very distant times or remote places, the surroundings of which must differ from those familiar to ourselves, we should discard all fixed impressions and preconceived notions, prepare our minds for the admission of new truths, and, as far as possible, transfer them to the times and places referred to.

Our Saxon forefathers had names of their own for the several months of the year, descriptive of their character. May was called "Three milkings," for in that month the pastures were luxuriant, and cattle milked thrice a day. July was styled "Hay month," for then they cut their hay — and December was known as "winter month," as then intense cold began. In the southern hemisphere the seasons of the northern are entirely reversed, and summer in the one is contrasted by winter in the other. To a Brazilian ever so learned in other matters, yet ignorant of this fact, such names would furnish plenary proof of ignorance and stupidity, and as bearing within themselves the plainest internal evidence of falsehood and impossibility. It certainly would require but little knowledge or reflection to correct such erroneous impressions; yet without that little he would feel justified in condemning the ancient Saxon as an unreliable fabulist, if nothing worse.

Simple and obvious as this rule of interpretation would seem to be, it is but too often overlooked and disregarded. Even in the elaborate works of men of science, its neglect is manifest in the palpable errors

and false conclusions which they at times contain. Within the torrid realms of Africa, some seriously affirm that as the Baobab and other trees attain such huge dimensions, their years must outnumber the chronology of the earth itself; and that even fifty centuries would be too brief a period for the acquisition of their gigantic proportions. "Rings of annual growth," too, they assert, have been found in them; and as some of these have been counted, and the remainder calculated upon the basis thus ascertained, the resulting number establishes conclusively the extreme antiquity of the monsters of the vegetable world. And we may also add with logical propriety, that from these premises it is apparent that Africa, or rather its torrid Baobab region, is by far the oldest portion of the terraqueous globe.

But such conclusions are wholly untenable, and fully as illogical as those of the Brazilian would be in regard to the Saxon months and people. The trees of the tropics are subjected to conditions so different from those prevailing in the temperate zones, that without proper allowances neither can be adopted as a standard for the other; and no comparison can be instituted between them. With us the forest tree grows really but four months in the year; the first, in the spring, being devoted to gathering strength and speed for its summer's work, and the last, in autumn, to a preparation for its winter's repose. During the other six months it is entirely dormant. How very different from this is it with the tree of the torrid zone. There it knows no winter, but one continued summer reigns throughout its life. It is perpetually crowned with verdure, pauses not

to rest or slumber, or to even change its leaves, but with an accelerated velocity incessantly adds to its dimensions. How, then, can the slow and limited growth of the temperate zones serve as a measure for the giants of the tropics? One grows but four months whilst the other is growing twelve, and their respective sizes cannot furnish any proof of the disparity of their ages. This conclusion is therefore evidently fallacious; and equally so is the statement cited for its confirmation. Common reason as well as high authority, assures us that no "rings of *annual growth*," can be found in the equatorial regions. Rings *may* possibly exist, but most certainly they are not the indices of the yearly increment in the growth of the plant; for annual rings are produced only by the joint operations of winter and summer, and they as much indicate the cessation of growth in the dormant season, as they do the additions made in the active period of the year. Alternations of heat and cold are requisite to induce the striking differences between the wood elaborated in summer, and that of the ensuing spring; and these markings only belong to the higher latitudes.

Sometimes, yea too often, in reaching to conclusions, some one fact, of which we may be either ignorant or forgetful, is omitted in our premises, and such omission is equally fatal as the insertion of a falsity; yet, notwithstanding, the reasoning seems to be fair, sound and rational, and the conclusion itself irresistible. This may be well illustrated by an incident that actually occurred in one of our southern towns not many years ago: One summer's evening, old Mrs. Frost and her daughters were sitting around the table,

busily engaged in sewing and chatting, an ordinary candle furnishing the light. The mother's eyes were greatly strained by the dim rays of the feeble luminary, and to brighten them, she, as most old ladies do, raised her spectacles to her brow and rested them there; then, with the middle finger of each hand, she methodically rubbed her eyes back and forth. Whilst so engaged, Betty, in attempting to snuff the candle, snuffed it out. Directly after, the old lady, in affrighted tones, exclaimed, "O my Lord! My Lord! My Lord!" "What's the matter, mother?" trembling Betty asked. "O my Lord! I'm struck blind, I'm struck blind," was the quick response of the sobbing, terrified mother. Horror stricken, the daughter hurriedly procured another light, by which the fact was instantly revealed, that instead of the old lady's eyes having gone out, it was only the candle. In this case the mother was entirely unaware that the candle had been extinguished; and, reasoning from her assumed premises, her conclusions were fair, sound and truly logical. Her syllogism may thus be presented:

Major—A moment ago I could see:

Minor—Now, I cannot see at all;

Therefore—I'm struck blind.

Neither Whately nor Aristotle could have done better. But the omission from her premises of an unknown fact has led to a conclusion as unsound as it is ridiculous. Fallacies of this kind much oftener occur than is generally supposed, and upon a scale truly grand and magnificent.

In this Second Part of our work we shall lay aside the word divine, and briefly examine a few of the

leaves in the great Book of Nature, another volume edited by the same proficient Author. As they both claim the same paternity, they will undoubtedly be found to agree in all their statements, *provided we shall interpret each of them correctly.* Thus interpreted they should do more than agree; they should reflect light upon each other's pages, and, by their mutual aid, both become more intelligible. They should be reciprocal expositors of each other's doubtful meaning and obscurities, and as such, may be legitimately used. It cannot be too emphatically affirmed as a truth, that the more thoroughly we understand the one, the more fully are we qualified to comprehend the other. As this Volume of Nature is an ancient work—giving an account of times the most remote and, of course, unfamiliar to us—it is equally liable with all others to great misconception. If we can misinterpret the language impressed upon the flexible leaves of ancient paper, equally may we misapprehend the impress made upon tablets of antique stone.

In such inquiries, to guard the mind against error and insure untainted deductions, all absolute prepossessions should be discarded, and every element dismissed that may possibly serve to bias or warp the judgment. When false and erroneous ingredients are inserted in, or other important facts omitted from, the premises, fallacious conclusions are the sure result, however specious and plausible may be the process of the reasoning. He who, upon the perusal of a work, whether written upon stone or paper, impartially seeks the truth, will first carefully attend to what the writer says, and strive to attain *his* meaning

fully, before indulging in any private conjectures or fanciful speculations; for then, and not before, is he qualified to pass a judgment upon the author's merits. This course, we trust, the reader will pursue; for established notions, resting upon illusory foundations, are the greatest barriers to the introduction and establishment of genuine unsophisticated truth.

CHAPTER I.

"Let all the nations be gathered together, and let the people be assembled. Who among them can declare this, and show us former things? Let them bring forth their witnesses, that they may be justified, or let them hear, and say, 'It is truth.'"

PHYSICAL GEOGRAPHY.

In the former part of our work, by a careful analysis and consideration of our most venerable history, we deduced, as a sure conclusion, that prior to the flood there existed a world, differing in all respects from the present, and to it exhibiting strong and marked contrasts in every feature. The history further unfolded to us that "the world that then was" entirely perished by submergence beneath the surrounding waters, and in its stead the earth that now is was upheaved as the abode of man. From the particulars forming the account of that wonderful physical revolution, we also ascertained that the position of that primeval world must undoubtedly have been situated within the bounds of the present Pacific ocean.

Man's experience, with such geological changes, is limited only to those of a diminutive class. Islands

have at times suddenly appeared above the ocean's surface, and others again have as quickly disappeared. Great changes, both of upheaval and subsidence, have taken place in continental levels, sometimes quickly, and at others in the most gradual and almost imperceptible manner; and but for the records made of such events, so oblivious is the mind of man as to terrestrial alterations, their remembrance would have been but of brief duration. But here we have an entire metamorphosis of the world itself; the whole has changed, as well the land as the sea; one half of the crust of the earth has sunk beneath the waters, and another portion, the former ocean's bed, has been upraised into the air above. Of this remarkable event, a written record, contemporaneously made, through willful ignorance, as is revealed to us, has failed to preserve in the memory of man the physical substitution that then occurred, although sustained by an universal tradition of its most striking feature.

That so momentous a transformation should have happened, and no vestige, as the geologist affirms, remain, is absolutely impossible. Not only traces and vestiges must abide, but memorials and monuments of the highest grade must exist, to attest in the most unequivocal manner the verity of the sacred record. To this investigation will our second part be exclusively devoted, and although the field is broad, and our space but limited, yet a few leading extracts from the page of Nature's volume will be found replete with emphatic significance, even with the feeble interpretation of the writer.

Naturally following the direction our previous in-

quiries suggest, we turn to the Pacific to learn what disclosures, if any, it may have to make.

The great ocean, as it has been aptly termed, presents to view one broadly expanded basin, save on the south entirely surrounded by high, rugged, and precipitous walls. All the tallest mountains of the globe, in one continuous band, stand here assembled around its steeply tilted shores, and, as a mighty pile of confused and tumultuous ruins, frown upon the deep; whilst on every side, from towering summits on the east, from the misshapen borders of the west, and throughout the midst of the briny waters themselves, numberless blazing volcanoes, from conical lava-stacks of their own erection, constantly diffuse the lurid glare of their funereal torches over the sullen scene. Here in a single assemblage are associated the proudest eminences of the earth, and the thronged array of its volcanic fires. Myriads of islands, with ragged, irregular, and unsymmetric shapes, isolated or in confused and disorderly groups, break the monotony of the ocean. Some of these are as large as continents, others consist of but a single rock, affording no foothold to the things of life. Some are greatly elevated and crowned with lava mountains, others barely emerge above the surface of the deep. Upon some the richest vegetation flourishes in the midst of scoriæ and ashes; upon others may be seen tall and majestic basaltic columns in extended lines, vanishing in the distance. As in the ruins of the earth the owl takes up its dwelling and satyrs dance, so, too, amidst the desolations of the sea, do the busy madrepores come and make their habitations. Upon the tops of sunken craters and submarine shoals they

build from the deep their annular atolls, encircling the still lagoons as monuments of the dead, whose very bones furnish the material for their calcareous structures.

Most of these islands, with their surfaces sloping in different directions, eminently suggestive of the leaning tower of Pisa, forcibly intimate that they stand inclined upon their sunken bases; and as a confirmation of the fact, the dashing breakers, with their noisy waves, here and there in mid ocean warn the wary mariner that a dangerous reef is near.

The shores of this great basin are everywhere suddenly deep and steep, except upon the coasts of Asia. Here its numerous gulfs, land-locked seas, and islands exhibiting an outline ragged in the extreme, legibly proclaim that the rocky crust of the earth has been absolutely sundered, and one portion fallen beneath the waters. In its entire vicinity are found the smallest islands, if they may so be called, consisting at times of single, huge, and massive rocks, destitute of soil and vegetation; and beneath the surrounding surface immense piles of rock exist, lying in confused heaps, as if detached from the adjoining continent.

The leading features of the Pacific are so prominent and peculiar, as to invest the minds of most persons with an assurance of their mysterious import; and upon some, more impressible and contemplative they have produced the fixed conviction that here, beneath the placid waters, evidently reposes a continent of former ages, which once connected the parted hemispheres of the present existing world. And although such a conclusion irresistibly arises, yet it is accompanied with such vagueness and un-

certainty as dissatisfies the mind, and urges it to probe the matter more deeply, the more clearly to grasp the hidden truths that here lie entombed.

The earth's great volcanic circle, as the geologist terms it, surrounds the basin of the Pacific, and although many of the ancient fires now cease to burn, their lava-beds and streams sufficiently indicate their former site and great activity. Commencing with Cape Horn, itself formerly a fiery beacon, the volcanic line along the crests of the Andes and Rocky Mountains exhibits itself in view of the Pacific, upon the whole western coast of America. The Aleutian islands connect the Eastern and Western hemispheres, and in their glowing craters manifest the line's continuity across the ocean; thence, from Kamschatka along the eastern shores of Asia, in multitudes of volcanic islands it maintains a consecutive train to the lowest extremity of that continent. This circle thus far described, surrounds the middle of the globe, and occupies meridians opposite to each other. From the southeastern portion of Asia, nearly in the direction of the ecliptic, lies a broad belt of volcanoes active and extinct, extending from the highest point on the earth's surface, near the northern tropic on that side of the equator, to the next highest pinnacle of the globe, near the southern tropic upon the opposite side of the world. This significant fact will be considered hereafter.

A natural inquiry now arises, from what inexhaustible reservoirs do these ever burning mountains derive their heat and flame? How and by what means do they reach their heights, and what do they teach? It is but too manifest that they can be de-

rived from no other source than the lava-lake of liquid fire within the earth, and which supports its solid crust. And it cannot come from thence, except through apertures and fissures extending quite through that crust, and opening into the fiery lake itself. As they are continuous, and in one consecutive line, they disclose the fact that throughout the great volcanic circle there is one extended and connected fissure around the middle of the earth, and another broad series of fissures in the direction of the ecliptic. Enormous rents on the tops of the rocky mountains in Mexico and South America, still visibly exist, uncovered by the wastes of ages, the more strongly to affirm the fact. No flame is seen to arise from them, for their sides are too closely compressed together to admit its passage. If upon any of our continents, a traveler of ordinary observation were suddenly to reach an extended area of ground, greatly depressed below the common surface, bounded by steep acclivities, and circumscribed by rents and fissures, no deep study or prolonged examination would be necessary to assure him, that here a subsidence of the earth had occurred. The proofs would be too palpable to permit the first budding of a doubt. Similar features present themselves on all sides of the Pacific basin, only in a more highly marked and pre-eminent degree. There, save where the mighty convulsion has thrown the imponderable rocks into confused piles and heaps, the precipitous shores suddenly fall beneath the waters; whilst around the margin, in a prolonged circuit, one continuous fracture gapes and yawns, whose subterranean depth is plainly told in the volcanic fires and rivers of reeking

lava that issue from its jaws. True, the ocean has rushed in and conceals the bottom from view, but that fact of itself confirms the many existing visible proofs, that here, too, as plainly as in the traveler's case, an actual subsidence has occurred.

As our scriptural record further affirms, that the submergence of the ancient Adamland was attended by the upheaval from the deep of the world now existing; that Noah left the one and was landed upon the other, which still abides as the home of his descendants; from the Pacific we should turn to the "dry land," to ascertain what testimonials it affords as to the writer's accuracy. The whole earth, its continents, mountains, hills, plateaus and plains, its gulfs and rivers, are pointed to as witnesses, and they should undergo the examination.

If we look upon a feather bed that has been slept upon, we can form an opinion of the kind of person that has used it, equally as well by the surrounding elevations as by the intermediate depression. The parts raised are the exact measures of the parts depressed; the displacement of the middle, manifests itself on all the sides, and if we choose by figures to estimate the dimensions, the size and weight of the party, the elevations alone will furnish the data. So in like manner, may we form a fair estimate of the world depressed, from the continents and islands that have been upraised by its subsidence. They furnish and represent the exact weight and dimensions of the primitive Adamland, and may be accepted as the faithful indices of the present ocean's depth.

Before proceeding with any investigation as to these elevations, whether of the feather bed or earth,

we should first, by all means, assure ourselves that the bed has really been slept upon, and not made up as we see it; otherwise we may be proceeding upon assumptions wholly unfounded, and our labor and pains be thrown away.

Force of some kind is necessary to the making up of earths and beds, and also to the unmaking of them; and for our present inquiry may be considered as simply divided into two kinds. One as regular and orderly, and such as generally prevails throughout the universe. This kind is exhibited in the revolutions of the heavenly bodies and their satellites, and operates so steadily and orderly that its effects are estimated with the greatest precision. In the laws of gravity, again, so uniform is its orderly action, that the speed, weight and momentum of bodies are readily ascertained by mathematical formulæ. The great ocean exemplifies this orderly force in a clear and beautiful manner. Take from its surface the irregular pressure of the winds, and every atom of water within its world-wide bounds, immediately nestles down into its own proper place, not a single misty particle remaining above his fellows, and the whole becomes an orderly and harmonious sphere. This species of force, in the regularity of its results, is manifested in the blade and ears of grain, in the budding and blooming of the rose, and in the unfolding of the lily. In the seven ages of human life, the poet has recognized and described it. Inventive genius has discovered and called to its aid this law of nature in many of the arts—in the shot-tower, the glass-house, and in other departments of mechanics, where uniformity of result is required. The potter

places his lump of clay upon his whirling table, and, for the production of different articles of manufacture, excites different speeds in the revolutions of the mass. Centrifugal force enables him to shape a plate or vase, which indicates the orderly force applied. The architect erects a splendid palace or gorgeous temple, by the repeated exertions of his own power, employed in a regular and methodical manner. The eye finds harmony in its proportions, and enjoys the unity of its several parts, and the grace and symmetry displayed in its construction.

The other kind of force may be termed irregular and disorderly, and is readily known by its fruits. They are always immethodical, unsymmetric, irregular and confused. Take the potter's orderly plate or vase, and crush it with your heel, and the misshapen fragments well disclose the disorderly force that has produced them. The graceful temple, when hurled to earth by hurricane or earthquake, presents one confused heap of ruins; and the eye that formerly admired its symmetry now readily detects the disorderly power that has wrought the chaotic change. So manifestly different are the effects of these two kinds of force, that simple vision, without philosophizing in the least, at a glance discovers and distinguishes them; and hence it is that the scenes in and around the Pacific have suggested to many minds the idea of a sunken world.

If we look abroad over the earth's surface, with the view of ascertaining what kind of force could have produced the "dry land" now existing, the mind, in a single cast of the eye, will be readily satisfied that no regular and orderly force has operated for its up-

heaval. No two continents exhibit the same shape or outline; no two the same size or elevation; no two the same features. Mountains, plateaus and plains seem promiscuously mingled and arranged, and run in every direction of the compass. This disarray is visible to the dullest eye, and is greatly increased by an examination in detail. Various estimates have been made of the superficial areas of the several continents of the earth, widely differing from each other, and in the table below we have placed the one deemed the most accurate. We have also added the general elevations of the continents, or their average heights above the sea, as ascertained by the careful researches of Humboldt and others, who, after many measurements made at different points, have computed that such would be the altitude of each continent, were the entire surface of the same reduced to a common level.

Africa has never received a proper share of scientific exploration, and has been shunned by the philosopher as if it were surrounded by a flaming sword, or reserved for the blackness of darkness forever; and although omitted in Humboldt's measurements, yet we have assigned it an elevation equal to Asia and South America, as from the most authentic accounts it is generally elevated and fully entitled to the rank assigned it.

Continents.	Area, square miles.	General Elevation.
Europe,	3,095,680	671 feet.
Asia,	16,270,747	1,132 "
Africa,	10,042,533	1,100 "
North America,	6,301,920	748 "
South America,	5,914,960	1,151 "
Australia,	2,542,880	
	44,168,720	

From this table it appears, that Asia the largest of all the continents, is elevated to the great height of 1132 feet. Europe, the smallest, and by the side of it, is only raised 671 feet above the ocean. North America, opposite Asia, is not greatly higher than Europe, whilst its neighbor, South America, small in size, is really higher than exalted Asia. The great bulk of these continents lies round about the northern portion of the globe, and gradually diminishes towards the south, until the "dry land" terminates in two pointed capes. These facts, considered in connection with the varied shapes and the diversified reliefs of the continents as to mountains, plateaus, hills, valleys and plains, remove all doubts as to whether the present earth has been produced by a regular and orderly force, or by one of the irregular kind.

By the laws of that mysterious power, known as universal gravity, each and every particle of matter comprising the earth is equally and uniformly attracted towards its centre. No one part or particle feels this influence more than another, and from this attraction, aided by rotary motion, the earth should exhibit the form of a perfect sphere, such as Moses

affirms it was in the beginning and at the time of the flood. Such a form would be the natural and necessary effect of a regular, orderly and uniform force. But it is not so now: for the simple and manifest reason that its primitive shape has been altered, and that, too, by a power or force of the irregular and disorderly kind.

When the learned tell us that the earth is practically a sphere, and that the mountains and elevations are but slight, and as mere grains of sand placed upon a globe, and have evidently been produced by some intestine commotions of the internal fluid, their explanation is certainly illusory, and well designed to hush the troublesome inquiries of the impertinent and curious. Yet their solution itself admits the exertion of some irregular disturbing force, but at best only removes the proximate difficulty one step farther back, and provokes the inquiry, What produced those intestine commotions?

The laws of gravity are certain, sure and well defined, and no one needs to be told that everything tends downwards, by a well ascertained rule. We can estimate the force necessary to throw an object to any given height in the air, and equally estimate the speed of its descent throughout every part of its fall, and acurately define the force with which it will strike the earth again. There is no uncertainty connected with this power; it has been too thoroughly investigated, and is too well understood. When the smallest and lightest bird arises in the air, he is compelled to exert a power that is greater than the attraction of gravity, which would draw him down again. Let him but close his wings when aloft, and

his rapid descent discloses that he is subject to this all pervading power. Mountains, hills and continents have no wings, and yet they have overcome this depressing force, and elevated their summits above the clouds, even to heights greater than the little bird can attain. Certainly they must have been upheaved by some power; they must have received the aid of some impelling force. Intestine commotions, we are told, and no doubt correctly, have caused their elevation. But that internal liquid lake is itself subject to this law of gravity, and being a fluid equally with the external ocean, would, if undisturbed, ever maintain a uniform spherical shape. Why then has it resisted the universal law, forsaken its rounded form, and with irregular bounds leaped from its accustomed bed, and with its violence upheaved irregular continents, plateaus and plains? It has evidently done so at some former period, but what induced it, and when, are pertinent questions that have never received an answer outside of Genesis.

Comparative Physical Geography is as yet but an imperfect science. Much remains to be done by its votaries to secure for it that degree of prominence which its importance demands. Yet, with its imperfections it unerringly discloses the fact, that the upheaval of the present earth is solely and entirely attributable to the subsidence of a single ancient continent, that existed once within the bounds of the Pacific Ocean, and now lies entombed beneath its waters. A comparative view of the existing dry land is only requisite to find the irregular and disorderly force that caused its upheaval; and the peculiar features of each of the continents points to the Pacific as the

source whence they have derived their origin. Examined as if from a centre in the great ocean, all the anomalies and irregularities of the several continents seem more orderly and regular, as if induced by some common cause, some unity of force acting upon each, and only varying in intensity and degree.

To have a clear conception of the subject, the reader should understand that any fluid pressed upon, will roll and move away from beneath the pressure, and exhibit itself at some other point. If a trough be partially filled with quicksilver, a nicely fitting board placed upon it at one end, and gradually pressed down towards the other, will urge the mercury before it, and cause an accumulation at the farther extremity. If upon a large box of mercury or other fluid, covered with elastic material, a triangular board of equal width be gradually impressed, the counterpart of the triangular depression will be exhibited in the surrounding elevations, and, instead of a single point at the upper end, now would be seen two points at the lower, one on either side of the sunken basin. A perfectly tough and elastic covering would ensure a uniformity of surface, but the substitution of brittle and frangible surface, uplifted by an irregular displacement of the fluid below would be attended with many disorderly fractures, with ragged edges, and the parts upheaved would take a tilted position.

As in our former discussions we discovered in every particular, strong and well marked contrasts between the ancient world and the present, so here, again, as might be naturally expected, do we find another. The existing earth is chiefly concentrated around the

north pole, and gradually diminishes towards the south, where it terminates in two pointed capes. The primitive world, on the other hand, consisted of but a single great undivided continent, with its greatest and broadest accumulation in the south, which contracted in dimension as it extended north of the equator, and finally ended in a single pointed cape between Asia and North America. It was this ancient Adamland that subsided, and by its enormous pressure upon the internal fluid upon which it rested, displaced it and caused it to roll away on either side, and upheave the rocky crust of earth, the former ocean-bed, to form the present hemispheres.

Physical geography discloses that this subsidence began upon the southern and southeastern portion, and gradually progressed towards the northwest; and it should be remembered, that instead of a simple triangular board upon a mass of mercury, the depressing body was really in form the half of a hollow sphere, filled with fluid viscous lava, flattening as it sank. The submersion, beginning in the south, would naturally press the liquid northward before it, and cause it to accumulate in that direction; and as the mass increased, so would it gradually escape from beneath the sinking hemisphere, and thus raise the adjoining parts. In this way do the southern capes define the beginning of the upheaval, and the regular widening of the continents mark its steady progression.

The continents not only widen as they proceed northward, but regularly increase in elevation, denoting the continual increment of the escaping fluid. South America attains its greatest height and breadth

a little south of the equator; whilst Africa, on the other side of the Pacific, continues as many degrees north of the line before it reaches its culminating point. A northwestward tendency in the uplifting force is here disclosed. So, too, Asia about the 30th parallel, and North America about the 50th, acquire their greatest altitudes, and exhibit a swollen crest which parts the waters and turns the rivers into different basins. The northern continents are heavy and massive accumulations, as if distended to plethoric fullness by the subterranean fluid heavily packed and compressed beneath them. This distension surrounds the globe, and even beneath the Atlantic furnishes a plateau upon which the telegraphic cables find a place of rest. It is thus evident that the subsidence of an ancient continent, chiefly in the south, has by its irresistible weight, impelled the interior fluid northward, and there so expended its energies in uplifting the rocky crust as almost to encircle the earth with dry land around the pole.

We next proceed to review certain other leading features of the several continents, common to them all, manifestly deriving their origin from one and the same cause, simultaneously exerted, and having the Pacific as its central seat.

Entirely around the deep and precipitous shores of the great ocean, a narrow and continuous plain extends between the ocean and the neighboring mountains. In Africa on the east, Asia on the east and south, and the two Americas on the west, contracted but fertile table lands form the margin of the continents.

Back of these plains, on every side, the tallest

mountains of the earth arise, and preserve a steady distance from the ocean's edge. Africa presents her Lupata chain to the Pacific on her eastern coast; South America her Andes upon her western side. The Himalaya and Hindoo Koosh, in Asia, face the Indian Ocean upon the south, and the Chinese mountains in a northeasterly direction conform to the outline of the Pacific on that side of that continent, and confront the Rocky Mountains beyond the ocean, pursuing a different direction. These frontier mountains generally consist of three several ranges, the most elevated being nearest to the Pacific, and the lowest, farthest from it. Beginning with the ocean's level at the southern capes, they regularly increase in altitude as the continents expand and widen, and that with so even a pace that the horizontal areas may be assumed as the natural shadows of the perpendicular heights. This analogy plainly argues that the force which upheaved the one unquestionably spread abroad the other.

Next behind these mountain chains in each continent is found a most remarkable witness, as well of this one common central force, as of the benignity of the Deity in the ample provision made for the welfare of his creatures. We allude to those immense pastures, which are found in each quarter of the globe, and are elevated to a height so peculiarly fitted to the luxuriant growth of grasses as most effectually forbids the intrusion of the surrounding forests. These constitute the blissful home of myriads of the herbivorous races, for whose happiness they are most eminently adapted and designed. Reposing upon the bases of the mountains, they attain an elevation

of from four to five thousand feet above the level of the ocean, and conform in shape to the figures of their respective continents. In South America the broad pampas lie to the east of the Andes, and slope towards the Atlantic; in North America, from the very foot of her western mountains do the immense prairies and savannas extend in the same direction. Asia has her luxuriant "steppes," north of the Himalaya and west of the Chinese ranges, sloping to the northwest; and Africa, in her inexhaustible "karroos," inclining to the Atlantic, conforms to the normal pattern.

Next in order to the elevated plateaus and pastures, invariably follow the continental plains or lowlands that lie on either side of the Atlantic ocean and around the Arctic, which is but a dependency of it, and as a great gulf connected with it.

Convincing as these features are, still others remain next to be noticed, of a most decisive and unequivocal character.

All the continents, from their extreme elevations on the Pacific side, exhibit a continuous descent to their opposite coasts, and then with gently shelving shores disappear beneath the ocean. Africa slopes to the west, and South America to the east. Western Asia and Europe as one, with a constant declivity westward, meet, in the deep and depressed trough of the Atlantic, the easterly slopes of North America;—whilst the northern portions of both hemispheres gradually recede from view beneath the Arctic ices. As a circular roof, on all sides descending from a central open court, so do the continents stand arranged around the Pacific basin; and all the waters

that fall upon this earthen shed, with but a slight abatement, are conducted by its rivers, not into the broadly expanded central basin, but into the narrow Atlantic and its Arctic gulf that surround the outer margin. This fact alone sufficiently demonstrates the region in which the force was exerted that upheaved the existing continents.

Were a mighty angel to cast upon the smooth and unruffled sea a stone like a great mill-stone, its force and momentum would be immense. As no two bodies can occupy the same space, the water so fiercely assailed would be forced to yield. It could not retreat downwards, nor laterally, for below and on all the sides, the same incompressible fluid would be found refusing to recede. Above, however, the air, more light, elastic and affable, invites its ascent, and accordingly the water, displaced and escaping from beneath the stone, takes that direction, and as a great wave bounds aloft. It is an established law of physics, that when a body is thrown upwards by any given force, it will acquire that same degree of force by falling down to the earth again. If a force of fifty pounds be exerted to secure the ascent of a body, the descent of that body through the same space ensures an equal force of fifty pounds. The volume of the first wave, or the quantity composing it, would arise to such a height as would exactly equal the force of the descending millstone; and it in turn would fall with equal force upon other water, farther from the centre, and produce a second wave of the same dimensions as itself. Thus wave would follow wave, and each indicate the force first exerted upon the unruffled sea, but necessarily with heights grad-

ually diminishing as their circumferences successively increased. If upon the surface of the sea were placed a material that would yield to the waves and yet retain their form as the resistance of the crust would diminish their successive heights, we should have a fair representation of the surface of the earth. All the continents, throughout their whole extent, imperishably preserve, in bold relief, the mighty billows that in succession chased each other as the irresistible Adamland impressed its descending weight upon the internal ocean of molten liquid lava. This universal wave-like appearance is termed by the learned geographers the "slopes and counterslopes" of the earth; and they stand arranged concentrically around the Pacific, constantly increasing in breadth and diminishing in height as they recede from the centre of undulation. Invariably do these reliefs present their short and steep counterslopes to the Pacific, with their long and gentle slopes stretching towards the Arctic and Atlantic; and that, too, by a proportion nearly constant, as the longer are generally from four to five times the length of the shorter sides. The three tiers of mountains around the great ocean, representing the first primary waves, exhibit their steep, rough and precipitous faces to the water, whilst their rear sides are much more gently inclined. The intervening valleys are but slightly depressed, and oftentimes form high sloping plateaus between the parallel ranges, as if the first oscillations in the ocean below were not only prodigiously great, but followed each other most rapidly. The elevated pampas, prairies, steppes and karroos, also exhibit in their rolling surfaces the same reliefs of slopes and

counterslopes, all conforming in direction to those of the primary mountains; and the continental lowlands, next below, in their humbler undulations, but with similar unequal slopes, well preserve the form of the upheaving waves, quite to the water's edge, and even beneath the ocean. These features are prominent and palpable, and we presume there are but few who have traveled in ordinary vehicles upon this (American) continent, and not observed, that in proceeding from west to east the hills ascended are always short and steep, whilst the descents have been long and gradual.

That this wave-like form is due to upheaval, and not to the action of running water, as suggested by Dr. Livingstone in relation to the African undulations—referred to by him in his letter to "Good Words," in June, 1868—is sufficiently demonstrated in the fact, that in these slopes and counterslopes is often exposed to view the primitive rocky crust of the earth in a tilted position, with edges rough and jagged, as if violently sundered from its adjoining parts and forced above its former level.

Other coincidences and similitudes, proceeding from a common cause, might be noticed, but as they are less palpable and would lead to controversy, and therefore require more space for their discussion than we can spare, we shall pass them by with but a simple reference to a single prominent feature.

Each of the continental areas exhibits a considerable depression in its central regions, as if the progress of subsidence had been suddenly arrested, and the last great wave that rolled to the outer margin had not been followed by a successor to sustain the parts behind it. In Africa, the interior great desert

is a sunken plain, with an elevated rim around it. North of the equator, between the Pacific and the Atlantic, the Danube, the Dnieper, the Don and the Volga, point unerringly to the luniform curvature of the extended surface. In North America, the Ohio and Mississippi mark the nethermost portions of the great central basin; and the Amazon, in South America, denotes the concavity of that continent. The uniform position of brine springs and mines of rock salt, upon the lower borders of these depressions—in Africa, in the desert; in Europe, along the southern range of mountains; in North America, on the line of the Alleghanies from Syracuse to Abingdon, and in South America, at the base of the eastern chain of mountains—argues forcibly, that when the continents were first upheaved, these basins then existed and were filled with sea water, which, by evaporation and absorption, slowly disappeared from off the surface. In other parts of the world, in very elevated positions, as in Utah and Siberia, salt lakes still remain undiminished, as rains and rivers regularly supply the amount of water removed in the form of vapor.

From these distinguishing features, thus considered, it is plainly evident that all the existing continents, though dissimilar in a general view, are yet really constructed upon a common model, and consist of similar parts and members, exhibiting a perfect parallelism in their affinities and relations, and methodically arranged about a common centre, which cannot elsewhere exist or be found, except within the limits of the Pacific ocean.

As some may be disposed to doubt the adequacy

of a subsidence of the earth's crust to upheave mountain chains, plateaus and plains, we cite a few, out of many instances, where the same has undeniably occurred in different regions of the globe. Where cause and effect persistently appear together, side by side, all skepticism should vanish. During the tumultuous cataclysm of Noah's day, the violent oscillations of the interior pent-up fluid were too excessive for the slight elasticity of its stony covering, and consequently very many fractures, severances, and absolute dislocations, were produced. These, as elsewhere, are plainly apparent around the coasts of Asia, for the upheaval of which massive continent the most prodigious energies were necessary. There we find ragged gulfs running into the main land, and splintery peninsulas, as fragments of the continents, jutting into the sea. Fractured on all sides during the general riot, the detached sections separately fell, and erected monumental proofs that they were only limited in extent, and entirely local in their character. The subsidence of the long and narrow fragment that once filled the space now occupied by the Red Sea, upheaved the chain of mountains that on the northeast side skirt its shores continuously. Obeying the general law, upon the water side the mountain face is steep and rough, and on the other the slope is gentle, extends far inland, accompanied with the usual plateau intervening between the summits and more distant plains. On the other shore of Arabia, east of the Persian Gulf, the same series of elevations occurs, with gentle declivities towards the northwest, instead of the northeast, as near the Red Sea. The peninsula of India more plainly de-

monstrates this canon of physical law. Upon the Malabar coast, and parallel with the ocean's edge, the Western Ghauts, for five hundred miles, present precipitous and rocky sides to the water, but with plateaus gently inclining to the northeast, upon the inland side develop the elevated table lands of the Deccan. Upon the opposite, or Coromandel coast, the Eastern Ghauts, less elevated, form the ocean's border, with its features reversed and its plateaus prolonged into the peninsula. Throughout the narrow and extended strip known as the Birman Empire and Malacca, similar features present themselves; whilst the circular coast of Cochin China, as if to remove all doubt and forcibly illustrate the relation of cause and effect, presents us with a circular range of mountains, conforming to the water line, with opposing slopes and counter-slopes, denoting the course of the upheaving waves below. Instances might be multiplied from Asia, and other parts of the world, as they are by no means few, but such repetitions are unnecessary and uninteresting, as each reader may, if so disposed, continue the investigations farther.

As these mountains could not elevate themselves, it is self-evident that some subterranean force has been exerted for their upheaval. For the production of this force no other cause can be assigned than the tumbling in, or sinking down, of the parts adjoining; and certainly none more adequate or more consistent with reason and existing physical facts, can be desired or need be looked for. It is further evident, that each mountain chain is the type and shadow of the force which produced it; for, had the force been

greater, the mountain would have been higher and broader; had it been less, then a lower elevation would have indicated its measure. The principle, then, will be received as undeniable, that all elevations, whether of mountains or continents, must be the equivalents of the forces exerted in their production; and, in fine, that subsidences and upheavals are commensurate with each other. From this brief review of the ocean, and existing continents, the fact stands plainly revealed, that the present dry land arose from the deep, under the violent impulses of a former sinking world that perished. This all the forms and reliefs of earth attest, and they even disclose the method of its madness. The amount elevated on the old hemisphere is nearly three times as great as that on the new. Asia, Europe and Africa measure 29,408,960 square miles in superficial extent, with a mean elevation of 1,073 feet, whilst the two Americas only number 12,216,880 square miles in surface, with an average elevation of 944 feet. And again, South America, with its extreme altitude and prolonged extension southward, affirms, that on that side the upheaving force was first exerted and felt; but the narrow American isthmus and the distended and amplified areas of Asia and Europe join in the assertion that the end differed from the beginning, and that north of the equator the great flow of the internal ocean changed its course northwestwardly and pursued the same direction with the external Pacific currents that bore the ark to Ararat.

The accompanying diagrams, exhibiting in profile section the forms of the earth, before and since the flood, are designed to convey to the mind of the

reader an adequate idea of the perfect contrast and radical change wrought by that revolutionary event. Of course the reliefs are disproportionately enlarged, as otherwise they would be imperceptible on so small a scale.

[*See Diagrams.*]

From the deductions already reached it will be readily conceded, that the ancient earth must have been fully as great as the present. And when it is remembered, that a large portion of the Adamland did not greatly, if at all, subside, but still remains as a vast submarine shoal, with myriads of peaks as reefs and islands projecting above the surface, it becomes further manifest, that its real extent was far greater than the aggregate areas of all the existing islands and continents. Had we the exact area and depth of water over this shoaly region, or as perfect a profile of the Pacific ocean's bed as Professor Maury has furnished of the Atlantic, we might deduce the dimensions and form of the ancient continent to a square mile. But we have no general soundings of that ocean that can be deemed reliable. It is true that many attempts have been made, and prodigious depths of certain points announced; and others again declared unfathomable even with the longest line, yet Professor Maury affirms as the result of his experience, that the currents of the ocean will sweep away the sounding cords indefinitely, even long after a heavy ball may have reached the bottom.

Nevertheless, as nature in all her ways is true, and in all her compensations and adjustments perfect, it

is possible that by following her lead, certain proximate results of a satisfactory kind may be reached. We know that throughout the universe, all her forces are ever engaged, never idle; that there is nowhere a single ounce of power that is not working up to its full capacity, and that at every point the most perfect balances and equipoises are steadily sought and continuously maintained. These are data, which, as axiomatic truths may be safely relied upon.

In making an estimate of the area of the primitive world, we assess the present continents, as upheaved and now standing, as of equal measure with their equivalents beneath the ocean. To the dimensions thus ascertained should be added that portion of the ancient world that still remains as a shoal, though denuded of its soil and surface by the powerful ocean currents. This part of the Pacific extends from Southern Asia towards South America, nearly in the line of the ecliptic, for 120 degrees, with an average width of 30 degrees, and comprehends an area equal to 22,637,160 square statute miles. The existing continents, exclusive of Australia, are estimated to contain 41,625,846 square miles, but are elevated to the average height of 1,000 feet above the sea. This elevation, if reduced to a level and placed in the Atlantic three miles deep, would furnish an additional superficial area of 2,666,666 square miles. We should then have

For continents . . .	41,625,846	sq. m.
For their elevation . .	2,666,666	"
For Pacific shoal . .	22,637,160	"
For the ancient world . .	66,929,672	"

This estimate is based upon the areas of the present continents, as generally received as correct; but whether really so, may be deemed problematical, as learned geographers have widely differed in their calculations. The area thus deduced would nearly equal one-third of the whole superficies of the globe.

If, next, we extend our speculations farther, and attempt to ascertain the probable shape and form of the primitive earth, it will in a measure serve to test and verify the reckoning as to its dimensions. Experiments with troughs of quicksilver, feather beds, and other plane surfaces, whilst sufficing well to illustrate the effect of displacements, would only mislead as to any other forms than the mere outlines of the depressing bodies; and for the simple reason that the outer parts displaced can never come together. With spheres and globes, however, the result is different, as the internal fluid is ever kept confined within certain and well defined bounds. If a globe as large as the earth consisted of land between the southern pole and the equator, so as to exhibit a perfect hemisphere of land on that side, and the northern half consisted of water, a depression of that land would transfer its image to the northern hemisphere, if unaccompanied with irregularities of force. And if irregularities were to occur in the upheaval, the same could be estimated and valued so as to remove all doubt as to the dimensions of the part depressed. So would it be if the ecliptic or any other parallels or meridians were adopted, if the interior fluid were forced to roll entirely around and make its effects visible. By former investigations, as well as by the certain lessons

taught in the subsidences and upheavals of the Red Sea, Persian Gulf, and other bays and gulfs of Asia and of the earth at large, we may accept the fact as indubitably established, that the elevated circle of bluff and precipitous mountains which surround the Pacific basin on its adverse and different sides, truly denotes the outline of a former world submerged. These montane heights, abundantly crowned with testimonials from the ancient sea, but too plainly indicate that they are stable landmarks and imperishable monuments of the form and shape of the primitive earth. The distance from America to Asia spans one-half of the globe, and a depression of the intermediate space should be reflected upon the opposite sides. From the large area remaining in the Pacific, as also from the depressions of all the existing continents, we are assured that the great convulsive throes in Noah's day were suddenly suspended before the work was fully completed; that the task begun, was not then wholly accomplished, but was stayed and reserved possibly for a future day. Had, however, no cessation occurred in the subsidence of the former continent, and had the powers of upheaval continued in the formation of dry land, it is clearly patent that the shelving trough of the Atlantic must have emerged from the deep, and thus developed one large continuous continent, the image of its parent. All around the north is now filled to overflowing. America and Europe are there nearly in contact, with their opposing shores farther south apparently tending towards each other, whilst all the sloping waves of the continents indicate the course of the interior fluid as it receded from the Pacific centre. The

Atlantic was, and probably is yet, its destination. Had no cessation occurred, the ancient Adamland would have been fully developed, but in the reverse order of its pristine parts. This singular but remarkable fact is easily verified. If upon a globe we conceive the eastern shores of Africa and western coast of South America to be extended so as to form a single cape, and the Atlantic to be filled in so as to make the continents continuous, we shall have the form of the primitive world renewed to us. For if this form be inverted in the Pacific, with Dr. Kane's open Polar Sea around the south pole, and the single cape between Asia and America pointing northward, so fully will it conform to the margin of the continents, and so completely will it fill the void, as to rivet the conviction, that such, indeed, was the size and shape of the ancient Adamland. If correct in this, then the superficial areas of the existing continents, which equal 41,625,846 square miles, added to the area of the Atlantic within the designated cape, equal to 25,500,000 more, give for the superficial extent of the primitive world, 66,125,846 square miles, a little more than our former estimate, based upon an hypothetical measurement of the Pacific shoals.

There is a series of physical phenomena, some of which, in one light, have been already adverted to, which when classified and viewed as parts of an especial system, present a most remarkable topic for deep consideration and profound study. Being intimately connected with the subject of this chapter, a brief notice will be devoted to them.

Although it is so frequently repeated that the earth is a globe, yet there are but few who actually realize

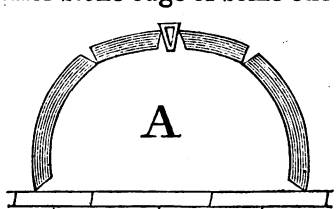
the fact and appreciate it to a full practical extent. When treating of the subsidence of the ocean's bed, no doubt many will, and cannot avoid supposing, that a broad and level plain has sunk down in the middle, so as to form a depressed valley. Such a misapprehension will arise from not having a vivid conception of the reality.

If a person were standing upon the southeastern shore of Asia, and looking thence for Cotopaxi in South America, he would be unable to see it, even if he were aided by Mr. Herschel's gigantic telescope, which reveals the smallest and most distant stars distinctly to his vision. The reason is, that between him and his object there is a great glowing lake of liquid fire, covered over with 25 miles of rock, and that again with water, the whole standing nearly 4,000 miles higher than his head. Were he to attempt to reach Cotopaxi in a direct line, he would have to pass over an immense arch, measuring 12,000 miles in length. Without climbing this arch he might turn to the northeast and travel along the coast of Asia, cross upon the Aleutian islands, and continue his journey on the American side until he reached the desired point. This latter route he would ascertain to be equally as short as that directly over the arch, as his path would be in the line where the two halves of the globe are joined together.

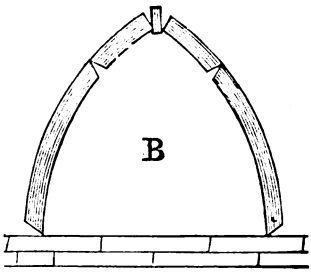
Arches are of many kinds, and though generally built in the most durable manner, yet at times are found to fail, to settle down, and thereby modify their original forms. In doing so, however, they seem to conform to some established rule, induced by the laws of forces and gravity—and each kind of arch observes

method peculiar to itself. Civil engineering is one of the reliable sciences. The members of that profession are ambitious to attain excellence, and in their enduring structures aim to erect for themselves imperishable monuments of their own proficiency. They combine experiment with theory, and practice and observation with their calculations, and from such a profession we are induced to believe that we may obtain reliable information regarding our Pacific arch. From Mahan we cite as follows:

"From observations taken on the manner in which large cylindrical arches settle, and experiments made on a small scale, it appears that in all cases of arches where the rise is equal to or less than half the span, they yield by the crown of the arch falling inward, and thrusting outward the lower portions, presenting five points of rupture, one at the keystone, one on each side of it, which limit the portions that fall inward, and one on each side near the springing lines (the base) which limit the parts thrust outwards. In pointed arches, or those in which the rise is greater than half the span, the tendency to yielding is in some cases different. Here the lower parts may fall inward and thrust upward and outward the parts near the crown. From this movement in arches, a pressure arises against the keystone, termed the horizontal thrust of the arch, the tendency of which is to crush the stone at the key, and to overturn the abutments of the arch, causing them to rotate about the exterior stone edge of some one of the horizontal joints."



To illustrate the above description, cuts are annexed, in which A represents the arch whose height is equal to or less than half its base; and



B, the arch whose height is greater than half its diameter. When ruptured, the two exhibit different features; yet in both it is at the crest or crown, and also at the base line, that we are to look for fissures. In the one, the summit is depressed, and in the other, raised by the inward pressure of the sides. A single fissure occurs at the base, where the sides repose upon the foundation; but on the crest the fractures present themselves not only at the keystone and at the centre, but for some distance on both sides of it, disclosing the breadth of the injury produced by the horizontal thrust.

Our Pacific arch, however, is a dome; yet a dome is but a number of arches combined together, and subject to the same strains, thrusts and casualties, as the parts composing it. Engineers generally confine the bases of their domes with stout iron bands, to prevent the outward thrust upon them, and to secure them against ruptures.

As the equatorial axis of the earth is twenty-six miles longer than the polar, the rise of the Pacific arch is greater than half its span, and therefore falls within the category of the second kind, marked B; and most truly does it accord in its present condition with the engineer's description of this kind of arch when broken. Around the Pacific, from Southern Asia, across the Aleutian islands, to Cotopaxi, and even to Cape Horn, along the base line of the two hemispheres, we have found a single continuous

fracture, through many parts of which volcanic fires have burned, or are still burning. Upon the whole eastern, northern, and northwestern sides, the evidences of rupture are very distinct and plainly visible. Upon the top of the dome, from Asia towards South America, with an axis connecting the two highest pinnacles of the earth, the manifestations of violent fracture and horizontal thrust are plainly seen in the irregular and mis-shapen islands that there exist; and that not only in a single line, in the keystone centre, but in a broad belt of great width on each side of it. To a professional engineer, these appearances would at once indicate, not only a deflection in the dome itself, but even the kind of dome it was, for the crest still remains upheld above, by the inward pressure of the sides.

But this upper or Pacific dome did not rest upon the kind of solid and immovable bases that engineers speak of, but upon another dome, bearing its own shape. Any outward thrust or outspread of the upper half, upon its base, should have caused a kindred outspread of the lower, accompanied with fissures and fractures corresponding with its own. This fact is well developed upon the earth's surface in what is termed, by geologists, the "earthquake region," almost directly opposite to the broad belt of fissures that extends from Asia across the upper dome towards South America; and these seem to be connected in Central Asia, and thence to pursue opposite courses. Commencing with the vicinity of the high peaks of Himalaya, "the region of earthquakes" runs southwestwardly over a broad tract of country, direct to the Atlantic, and includes within its bounds Caucasus and

Mount Ararat; the "fields of fire" that sport around the Caspian Sea, Northern Persia, Sinai and the Dead Sea, the whole of Syria and Palestine, the Grecian Archipelago, Etna, Vesuvius, Italy, Sicily, and the Lipari Islands, Southern France, Spain, Portugal, and the northwestern portion of Africa. In the Atlantic, on its eastern side, we find the volcanic islands—the Canaries, Azores and Cape Verde; and upon the western again, St. Thomas, Trinidad and the frequently shaken West India islands, with volcanic exhibitions, continuing the line through the northern part of South America, and there connecting again with the base of the two hemispheres. This belt upon the lower dome may not be perfectly continuous beneath the Atlantic, yet it is sufficiently so to be accepted as a counterpart to the one on the opposite side of the globe. The volcanic islands in the Atlantic—John Mayen, Iceland, the Azores, Madeira, Canary, Cape Verde, Ascension and St. Helena, with another in the antarctic region—stand arranged north and south, nearly upon the same meridian, opposite to the middle of the Pacific Ocean, and extend from pole to pole, and strongly suggest the conclusion that the violent uplifting of the continents on both sides has on this line produced an extended fissure by an inward flexure of the rocky crust of the earth, and the deep trough-like basin of the Atlantic would serve to confirm such a conclusion. Within these lines, the one around the base of the two hemispheres, the broad belt following nearly in the path of the sun around the earth, and the meridianal fissure in the Atlantic, are comprised the volcanoes of the globe; and it is worthy of especial notice that where the two

lines cross each other, as in Southern Asia, there the volcanic fires are most active and numerous. Thus classified and viewed, these burning beacons no longer appear in scattered and promiscuous confusion, but stand arranged in that natural order and disposition which would result from the outspreading declension of the primitive dome. This undoubtedly did occur, and, as the flaming witnesses testify, agreeably to scientific formulæ, and in perfect accordance with the rules and principles pertaining to such forms.

From this examination and review of physical nature, the reader is better prepared to comprehend how the great subsidence occurred, and why it paused before the present continents were rendered continous; and also why the broad crown of the arch still remains upheld by its opposing walls; and why such great elevations and irregularities upon the earth exist, upheld, as it were, in defiance of all the laws of gravity, evenly balanced upon the surface of a fiery lake, itself compressed out of its normal form. That great arch, though rent and fractured, still spans the Pacific, and holds firmly back to their places the opposing mountains upon its shores.

The present irregular reliefs of the continents most plainly indicate a spasmodic and tumultuous condition in the forces that produced them. Balances exist, yet they are forced, and, as it were, unnatural; so abnormal, that they must ultimately adjust themselves and secure an equipoise that is more conformable with the leveling laws of gravity. This is the master-power of the universe. It is gravity that sends the vapors up into the region of clouds, and brings them down again in the form of rain. It is

gravity that places the snow upon the mountain heights, and again compels its melted waters to seek the ocean's level. It is this gravity that gives force and direction to the gentle winds and waves, and produces the whirlwind and the storm. Gravity gave to the plateaus and mountains their forced elevations, and the same gravity again will humble their exalted heads. From Noah's day, Nature has been laboring to re-adjust the irregularities existing throughout her realms. This is witnessed on every side, and attested by the action of all the elements. Earthquakes and volcanoes loudly proclaim the fact.

Shall blocks of stone, from the shattered arches of the earth, fall from their places into the internal liquid ocean, waves are therein produced precisely like those excited by the mighty angel with his mill-stone thrown into the Pacific. If the blocks are but small, the undulations produced correspond in size and are to only a limited extent feebly felt; but if they be large and weighty, the waves, excited, will roll from pole to pole, and manifest themselves around the earth upon the sea and land. They who have felt the ground to rock to and fro, to swell and sink beneath their feet, and have witnessed the oscillations of the earth in their flowing movements, compare them to the surface of the ocean when in its phase of rolling billows. Thus earthquakes are the effects of waves, and these are produced by the tumbling in of the dissevered vaussoirs from the inner layers, most commonly of the fractured domes of earth. This leveling process is unceasingly continued, for there is seldom a day that passes unaccompanied by

the tremors of an earthquake in some portion of the globe.

Volcanic effusions exhibit the efforts of nature in adjusting the abnormal balances in a different way. If a volcanic mountain be three miles high, and the solid crust of the earth twenty-four miles thick, then the orifice from which the lava flows must be twenty-seven miles above the reservoir from which its supplies are drawn. But gravity is king, and it is equally as impossible for this viscous fluid to rise from the basin, run up to the mountain top and there flow over, as for the water of a fire engine to flow through pipe and hose into the upper story of a house without extraneous force. A subsidence of the rocky crust of the earth upon the liquid lake, is the piston that impels the fluid through the mountain hose, and ejects it from its crater. In Noah's day, when the ancient continent was sinking down, myriads of open fissures were streaming with liquid fire, mountains of lava were formed in the shortest time, and the great fountains of the deep were, by chimneys erected in the sea, quickly converted from spouting waters into gleaming fires. Etna and Vesuvius, as samples of their kind, then three miles down, with a sinking world three miles above them, in their accumulated lavas loudly bespeak the intense force exerted upon that occasion. And they further lucidly testify, that great waves existed in the internal sea when their cones were forming; for their lava beds are separable into distinct layers, as if deposited intermittently, and each had cooled beneath the waters of the ocean before another was placed upon it. All of which undoubtedly occurred within the short space of 150

days, instead of as many hundreds of thousands of years, which would be required according to the conclusions of those whose reckonings are solely based upon the lengthened periods that now intervene between successive eruptions. Then, too, in the spasmodic throes of the earth, were opened the myriads of fissures that traverse the regions of greatest upheaval, and bear the names of dikes and veins. These, running in every possible direction, decreasing in width as they descend, with the primitive strata of the underlying side most commonly at a higher level than the overlying, were then filled with the foreign matters they are now found to contain.* From above, the drifting sands, clays, and calcareous and alkaline scourings of the ocean's bed were derived, and these were intensely heated, fused, or otherwise chemically combined into gangues of different kinds, by the mineral and metallic vapors rising from below and condensing in their midst. The subsequent faults, slips and other displacement of their parts furnish additional proof, that each and every department of nature has heretofore labored, and is still striving, to regain the primitive normal equipoise; and that they will ultimately accomplish the object of their combined efforts, we may rest assured, if there be any truth in prophecy or philosophy.

Some may be disposed to ask, why it is that the first happy balances were destroyed, and the present disarray substituted in their place? Why such a retrograde change? and some may even deem it a species of impiety to conceive that God's work has

* Cathcart on Mineral Veins.

exhibited the imperfections that are incident to the domes of man. The latter class should remember, that it was God who first fashioned these structures, and the engineers copied them, and that these forms are necessarily subjected to one common law of thrust, gravity and decadence, by whomsoever made. Were we able to ascribe satisfactorily these effects to natural causes—to the cooling and shrinking of the interior fluid, or its spherical covering, to the influences of solar heat and attraction, to tides in the atmosphere and the external and internal oceans, to these singly or combined with others that might be suggested, operating most powerfully in the path of the sun, and there producing, in a broad belt, alternate and contrary flexures in the rocky crust, and so impairing the cohesion of its parts—the semblance of impiety would still remain, as the earth's original imperfections would thereby be not at all removed, but would be fully acknowledged and thoroughly confirmed. Similar questions may be asked as to all terrestrial things, but the response can only come from Him, whose Almighty wisdom composed one harmonious universe out of many seemingly unharmonious parts. The earth itself is but a creature of an infinite power, which has given to all created things their appointed times, and planned for each the successive changes through which they must necessarily pass. The vegetable and animal, as well as the inanimate mineral kingdom, acknowledge their due submission to the supremacy of this law. The fact is not less palpable and certain, though the reason is unattainable in this probationary stage of faith. The human form itself invariably passes through

well defined and successive metamorphoses, and the proudest philosopher is unable to divine the why. First seen, it appears a little baldheaded, round-faced, toothless and unconscious infant. Soon it changes, becomes most commonly white haired, and gains a set of teeth. This hair, in due season, turns to black or brown, and the teeth drop out only to be replaced by another kind. Again, the round face becomes oval or elongated, and the pug nose rises into the Roman, Grecian or other form. At a later stage the voice changes, goatees and mustaches appear, and as a happy father, in his living miniature the man now beholds his own first infantile state renewed. Later again, that head from gray becomes smooth and hairless. The plump cheek of youth is furrowed with the wrinkles of age, and even the perfect eye, that lends grace to form and charm to life, even these matchless optical *domes*, will subside and flatten on their outer sides, so as to require the factitious aid of glasses to enable them to subserve their purpose. Successive stages and especial mutations are appointed for all things earthy and perishable and none may at a bound attain the full vigor of maturity, and none suddenly drop from maturity into dust and nothingness. Comets as well as men, plants and insects, must bend their necks to this common yoke. The earth has her appointed phases, as is plainly revealed to us by her Maker, as well as to her beginning as to her end. Her past, her present and her future, have all been preordained and established from the first, and her destined changes announced to us for the confirmation of our faith. As all things made of earthy particles observe this graduated scale of growing

infirmity as they decline in life, so equally is it apparent that the earth itself, of which the bodies of all minor things are composed, is now waxing old as doth a garment. The whole and all its parts, the mother and all her children, exhibit their relationship in the similitude of their natures, in their catholic obedience to the laws of transformation, in gradually waxing as they approach maturity, and as gradually waning in their progress to extinction.

We trust, that, although the topics of this chapter have been but briefly and imperfectly discussed, the reader is convinced that there has been a deluge; a universal deluge, such as is plainly announced in the holy scriptures. That its fullness and completeness, and even its progress and method, are discernible in all that still exists and surrounds us. With the information recorded in the scriptures as to the precise progress of the subsidence at the beginning, and of the upheaval at the end of the flood—each measuring fifteen cubits to the period of forty days—the features of physical geography and geology; well defined and ascertained, furnish many interesting themes for the consideration of the learned. To the geographer and the geologist, the professional engineer and mathematician, the mariner and marine philosopher, and other devotees of science, are severally propounded divers dainty problems, worthy of their solution. In this connection, and as throwing more light upon the subject, there is a passage in the Bible, to which we must call the reader's attention. The antediluvian history comes to us through Noah, and if no other, that portion descriptive of the flood

is certainly derived from his pen. For a knowledge of the facts recorded, we are indebted to him. When we read that "the earth was corrupt," what are we to understand by such a singular and remarkable combination of words? No definite idea of their meaning can be formed, when taken in their ordinary acceptation. If not senseless, they are beyond comprehension. If, however, our translators have selected the word "corrupt," as the nearest English synonym to the corresponding Hebrew word, by analysis we can attain its true import in this sentence. The word "corrupt" is composed of two Latin words, "con," and "ruptus," meaning, broken together, and this is its primary signification. The ordinary definitions, rotten, tainted, putrefied, are derivatives from the primary sense, and when applied as they usually are to vegetable and animal matters, whose lesions and tissues have been broken up by casualty or death, are very appropriate. Even when applied to man as a moral agent, the word implies that his virtuous constitution has been broken up, and although the phrase is figurative, yet it is both forcible and expressive. But when the word is used to denote the condition of physical earth and rocks, this secondary and derivative sense is without meaning and evidently inappropriate. The primary sense is in this case the most suitable one, and that the writer so intended to be understood is plainly disclosed in the context. The earth was not only "broken up," but the fact was visible to the eye. The sense of sight is resorted to by the writer, to communicate to us the then condition of the earth, and as these are connected together in the text, we ask by what association of ideas, un-

less suggested by the then existing association of facts? "And God *looked* upon the earth and *beheld* it was *corrupt*." This condition of the earth was certainly visible, for when "*looked*" upon, it was "beheld." From a fair and sensible interpretation of the text, the author intends that we shall understand that the primitive earth had exhibited evidences of decay and subsidence, not for a brief period only before the flood, but even for 120 years prior to that event; and when it is further remembered that Noah resided somewhere to the east of the shattered coast of Asia, where to this day the evidences of such breaking up of the earth's crust are of the most unmistakeable character, this view of the text acquires additional strength. If this interpretation be correct, it assists in forming a correct notion of the subsidence and upheaval of the two worlds; that it did not occur with violent speed, but, relatively speaking, slowly and gradually. The length of time occupied by Noah in his voyage, and his long inactivity as well, at first at Noeville as at last upon Ararat, afford some indication as to the steady measure of its progress.

The earth, then, as a whole and in all its parts, proclaims, that the "great ocean" was once the happy home of the first sons of Adam. Beneath its placid waters now repose the giant forms of the ancient dead. Innumerable monuments must there remain to testify as to its former existence. Its briny bed must abound in relics and treasures which, if sought for and regained, would gratify and astonish us with their curious, antique and unknown forms. Travel-

ers and geographers have passed over this rich mine of antiquity, regardless and ignorant of its accumulated stores. The pearl, coral insects, madrepores, shells and volcanoes have engrossed the attention of the learned, who persistently ignore the deluge, and maintain that as the earth now stands so has it stood from the beginning, prior to man's creation. Have relics been discovered, only a passing thought has been bestowed upon them, and their true and real value has received neither examination nor discussiou. Only a few are even alluded to by scientific writers, and that in so brief a way as to leave their merits entirely uncertain and ambiguous. Cities are known to exist in the Pacific, and relics have been fished up, but the learned, zealously eager in the pursuit of geological science, accept them readily and hastily only as proofs of subsidence, and as works of post-diluvian hands who have, in an unfortunate hour at some former period, been engulfed by the ocean. This may or may not be true; they may be the productions of the past or the present, but no inquiry has been made, nor pains taken, to settle the doubt. As the subject may not prove uninteresting to the reader, we cite from Col. Smith's Natural History of the Human Species a few instances:

"Although Chinese history commences with their deified heroes, toiling to clear the upper provinces of lakes and marshes, the sea, particularly between the main coast and Formosa, by many geographical indications supports the local tradition of submersion, and the tale, notwithstanding a due allowance for the expert impostorship of the natives, seems confirmed by the fisherman's drag-nets occasionally bringing to the surface a *curiously-colored porcelain*,

which the art, as now understood in the Celestial Empire, is *unable to produce.*"

In this recital, we find the research for evidences of subsidence so completely over-riding all other questions, that even China, possessing artistic traits that defy the imitative talents of the most perfect masters of the art in the present earth, is hastily accepted as proof, that ancient Chinese, totally unheard of, formerly had their homes in the midst of the sea, but have, at some unknown time, been engulfed by its waters. But Noah, as well as very many others, lived out in that direction, from which, since his time, the ocean currents have been sweeping its bed towards the land, and it is equally as probable, and really more so, that the porcelain thus fished up was his or theirs, as that it was manufactured by a race of men whose descendants, since the earliest period, have remained stationary, neither losing nor gaining ground in this art, their national specialty, and who yet most unaccountably have lost it. But to continue our quotations from the same author:

"In Japan, volcanic convulsions have been unremitting from periods *anterior* to the *most ancient* records of the nation; for to them alone can be ascribed the repeated discoveries, at great depth, of jewels and manufactured objects, *totally distinct* from the *present*, and noticed by all the native literati as *more ancient* than the *existing creation.*"

Now here, again, are certainly objects highly worthy of study and investigation, which the learned Japanese themselves positively affirm must antedate everything in the history of that people.

"On the line of volcanic agitation south of Japan,

and near a crater in constant activity, is the Island of Ascension, now, like many others of this and the neighboring clusters, low and small. Here there was lately discovered, by the officers of Her Majesty's sloop Raven, the ruins of a city still it seems known by the name of Tamen. It stands so far in the wash of the waves that a boat is necessary to land at the buildings, which are composed of very large blocks of stone, some being twenty feet in length. Other reports were subsequently brought to Sydney, stating that one or two other cities of similar work were extant on other islands and equally submerged. One, indeed, seated on an island named Pouznipète, is mentioned by Mr. C. Darwin, in his volume on the structure and distribution of coral reefs, but he *supposes* it to be the first mentioned. Tinian, however, is not far remote, and there, when Lord Anson landed, were found two parallel rows of squared upright stones, in the form of obelisks, each surmounted by a coping block, immediately recalling to mind the colossal pillar-idols of Easter Island, which are known to have been the work of a departed population, probably of the same race that once inhabited Pitcairn's—the late well known retreat of the mutineers of The Bounty. These antique and now forsaken cities must have been constructed by a people totally distinct from the present inhabitants, and much more numerous than the existing locality could now supply with food. The group is entirely composed of volcanic cones and of low coral reef islands; and we agree with Mr. Darwin in opinion, that they are the remains of land, once much greater in extent, but sunken beneath the sea level, by the effect of the excavations of igneous exhaustion."

These extracts, from their uncertainty, must suffice; and whilst they exhibit enough to invite further examination and continued research to resolve the doubts as to their true paternity, yet whether of ante or post-diluvian origin, they firmly establish a subsi-

dence of the Pacific's bed, and thereby, in a most intelligible and powerful manner, corroborate the affirmation of Holy Writ, that thus was a former world totally submerged and destroyed. Other and innumerable witnesses must abound in this

"Hollow sounding and mysterious main."

Cities great, and many adorned with the varied contributions of curious and forgotten arts and antique sciences, must exist to tell their tales of the olden times. Enoch, honored with the name of Cain's first-born, still rests upon the land of Nod, on the east of Eden; and Tubal Cain's School of Mines yet designates the site where every artificer of brass and iron received instruction. Perhaps the grand harps and organs of Jubal, locked and confined within the solid walls of spacious temples, even now may furnish specimens of his proficiency; and all the treasure caves and cells of ocean, carefully preserving the things entrusted to their charge, must teem with the testimonies of a pre-existing earth.

"Yet more! the depths have more! Thy waves have rolled
Above the cities of a world gone by!
Sand hath filled up the palaces of old,
Seaweed o'ergrown the halls of revelry!
Dash o'er them, Ocean! in thy scornful play;
Man yields them to decay!

"Yet more! the billows and the depths have more!
High hearts and brave are gathered to thy breast!
They hear not now, the booming waters' roar—
The battle thunders will not break their rest.
Keep thy red gold and gems, thou stormy grave!
Give back the true and brave!

"Give back the lost and lovely! Those for whom
The place was kept at board and hearth so long:
The prayer went up through midnight's breathless gloom,
And the vain yearning woke 'midst festal song!
Hold fast thy buried isles, thy towers overthrown—
But all is not thine own.

"To thee the love of woman hath gone down;
Dark flow thy tides o'er manhood's noble head,
O'er youth's bright locks, and beauty's flowery crown!
Yet must thou hear a voice—Restore thy dead!
Earth shall reclaim her precious things from thee!
Restore the dead, thou Sea!"

MRS. HEMANS.

In further confirmation of this interpretation of the sacred page, we confidently refer to the total absence from the present earth of any human memorials whatever, of an antediluvian character. As multitudes have thought, we cite what Bishop Berkeley, in wonder, exultingly wrote:

"How comes it," says he, "then to pass, that no remains are found, no antiquities of those numerous ages, preceding the scripture accounts of time; that no fragments of buildings, no public monuments, no intaglios, cameos, statues, basso-relievos, medals, inscriptions, utensils, or artificial works of any kind, are ever discovered, which may bear testimony to the existence of those mighty empires, those successions of monarchs, heroes and demigods, for so many thousand years?"

The same scripture that gave to him such accounts of the preceding time, also furnished an answer to his question, but he failed to discern it. He was slow to understand, that the earth that then was totally perished, and now lies entombed with all its works and witnesses beneath the waters. Those ancient mon-

archs, heroes and demigods, did not live upon an ocean, nor upon the modern uplifted world, but upon a once happy land, now the home of whales and fishes.

"A merry place, 'tis said, in days of yore;
But something ails it now—the place is cursed."

Yea, cursed by God, contemned by man, with none so poor as to do it reverence.

ALAS! POOR YORICK!

CHAPTER II.

"And now there came both mist and snow,
And it grew wondrous cold;
And ice mast-high came floating by,
As green as emerald."—ANCIENT MARINER.

IN the ages immediately succeeding the flood, as the descendants of Noah increased and multiplied, they migrated from Babel towards the east and west; but whithersoever they went, as if by common consent, or actuated by some common impulse, they erected towers, pyramids, tables of stone, and, for want of stone, immense mounds of earth. These ancient memorials, all bearing a resemblance to each other, have been found extending from eastern Asia to western Europe in an unbroken line; thence crossing the Atlantic, their continuity has been preserved throughout America to the very shores of the Pacific. The learned who have investigated them affirm that

they are arkite structures—human memorials of the deluge. The different forms bear different names, and from Col. Smith's interesting work, before referred to, we cite his account of the location of that class known as cromlechs:

"Thus, in particular, those bearing the character of cromlechs pass down the west side of the Indus to the sea; then divide, one line eastward following the coast to the Coimbatoor as before noticed, and farther on to China and the islands of the Pacific; while the other forming two branches, one follows the mountain chain to the Caspian, the other by the Helmund, through the desert of Iran to Persepolis, and up the Tigris till it meets the first on the high land of Armenia, where they become directly referable to Cyclopean and other Celto-Finnic tribes, and pass from both coasts of Asia Minor along the two shores of the Mediterranean up the west coast of Spain, and by the Alps and Cevennes down the Loire to the sea, where both unite again, and then skirt the ocean towards the north, cross over into Britain, the final extension ending in Norway. With the exception of a few observed in the United States, no monuments of this class are found in any other direction."

Testimonials of this kind are very numerous throughout the existing continents, yet they are the work of men's hands, without any surviving expositor as to their meaning, and at best can utter but imperfect and uncertain sounds. As their worth and value have been elaborately discussed by others, we pass them by to consider another class of monuments, somewhat of similar character, placed by the Almighty hand, and accompanied by living, existing interpreters, whose trumpet notes are clear, distinct and free from the least uncertainty. It is with such witnesses

we like to deal, and such testimony as we prefer to lay before the reader.

The geologist, in pursuing his researches over the earth, found throughout its northern regions rocks of large size, promiscuously scattered over the surface, accompanied with smaller rocks and even pebbles and sands. These being unlike the ordinary strata and formation of the several countries in which they were found, being clearly strangers in strange lands, far away from their native homes, first attracted his attention, and naturally provoked inquiry. Investigation established that they had come from the north; and as they were found to lie in direct lines, in broad belts and heaps, with their sides often scratched and polished, it became evident that they had been transported by some powerful agency, and in the course of their transfer had been rubbed against other bodies as hard and solid as themselves. The rocky surface of the earth, and the sloping flanks of mountains in Scotland and the north, were found scratched and furrowed in like manner, and at once suggested this as the line of their journey, and mutual attrition as the cause of their common scars. The removal of these "boulders, erratics and moraines," as they were termed, through such great distances, proved a perplexing mystery to the learned, and for a long time foiled the speculations of the most ingenious. Some, however, visiting the interesting valley of Chamouni, there beheld the Swiss glacier in its majesty, twenty miles in length, two or three in breadth, and six hundred feet in height, slowly creeping down the gentle slopes, loaded with boulders and moraines. These, upon examination, were found scratched and

polished, and the rocky bed upon which it moved exhibited scores and furrows in the glacier's path, and five hundred feet a year was ascertained to be the speed of its downward movement. Thus Chamouni suggested, for the distribution of all the boulders and moraines of the northern hemisphere, "The Glacial Theory;" a theory which at once raised its authors to the skies, and received the unbounded sanction and applause of the philosophic world. It cut the gordian knot and resolved the long provoking problem.

By the Glacial Theory, or Period, as it is termed, we are given by its authors to understand, that at the end of the tertiary epoch, from excessively hot, the climate of the earth became exceedingly cold; and to such a degree that both the northern and southern hemispheres beyond the parallels of thirty-six degrees were covered with polar glaciers, slowly traveling towards the tropics. That these enormous masses of ice, moving along the ground, as Swiss glaciers now do, by their great weight scored the flanks of the Scotch and other mountains and furrowed the rocky surface of the earth, and, as they melted, deposited the many large stones and detached fragments which they had gathered at distant points, and thus transported far away from their native homes.

True it is, that on a portion of the way from the pole, it would be somewhat up-hill towards the equator, but that is a small difficulty, and might possibly be accomplished by well disciplined glaciers; and traveling at the rate of five hundred feet per annum, would only require about twenty-five thousand years for an icy porter to bring down a load of rocks from

the arctic regions. But what of that? One or two, or even five hundred thousand years, was too small an item in the geological calendar to receive the least consideration. The theory was deemed all-sufficient to explain the difficulty, and did explain it handsomely. But in doing so, it only introduced another perplexity still greater than the first — the interpreter introduced "needed the most interpretation of the two." Why was it, that during these myriads of centuries, whilst these glaciers were slowly creeping about the earth, dropping here and there their large rocks and small gravel, that the arctic cold had invaded the temperate zone? Why ices now reigned and ruled, where fruit and flowers, beasts and birds, before that, rejoiced in their genial homes? This anomaly yet remains a mystery, and defies all attempts at explanation, and, notwithstanding, the theory is accepted as a truth established. Without this glacial theory, the philosopher is unable to account for the boulders; and he cannot account for the glaciers without the aid of a freezing atmosphere. As a general rule, they who most freely indulge in such speculations have a loathing abhorrence of everything that savors of the miracle. Yet they can readily invoke the aid of one when necessity demands its service. Every suspension or reversal of the ordinary and established laws of nature is a miracle; and whilst our learned friends can pity and deplore the superstitious credulity of those who believe that Joshua stopped the sun for a single day—a statement susceptible of rational explanation—they themselves do not hesitate to withhold the sun's rays from the surface of the earth, for thousands of years, only to

drop some rocks about, to puzzle philosophers and afford a scope for their ingenious conceptions. These deductions of scientific men are very natural conclusions from their premises; but having omitted the Flood therefrom, their logic closely resembles that of old Mrs. Frost with her candle snuffed out. Peter's Mirror truly reflects the fallacy in their syllogism, and at the same time exhibits to us the boulders in course of transportation. With scripture as the key, the great perplexity is unraveled in the most natural manner, without the slightest need of a miracle, and in a space of time credibly short, instead of incredibly long.

When Noah and his ancestors were living in the present Pacific, on the then dry land which had emerged from chaos on the third day of creation, the present earth was one vast ocean. Nature's ways then upon that ocean, were pretty much as they are now in our days, and but little learning is necessary to unfold to us what they were.

In the North Atlantic, every spring, the "icebergs" and "fields of ice" from the frigid zone are found floating towards the equator; and the prudent mariner in crossing the ocean at that season, takes a more southerly route to avoid collision with such an unequal foe. These bergs bear within their bodies the same kinds of boulders and moraines that now lie scattered upon the earth's surface. Dr. Kane, in his Arctic expedition, saw them in the different stages of formation, and thus describes them:

"The spot at which we landed I have called Cape James Kent. It was a lofty headland, and the land-ice which hugged its base was covered with rocks

from the cliffs above. As I looked over the ice-belt, losing itself in the far distance and covered with its millions of tons of rubbish, green stones, lime stones, chlorite slates, rounded and angular, massive and ground to powder, its importance as a geological agent in the transportation of drift, struck me with great force. Its whole substance was studded with these varied contributions from the shore; and farther to the south, upon the now frozen waters of Marshall bay, I could recognize raft after raft from the last year's ice-belt, which had been caught by the winter, each one laden with its heavy freight of modern material.

"The water torrents and thaws of summer unite with the tides in disengaging the icebelt from the coast; but it is not uncommon for large bergs to drive against it and carry away the growth of many years. I have found masses that had been detached in this way floating many miles out at sea; long symmetrical tables, 200 feet long by 80 broad, covered with large angular blocks, and seemingly impregnated throughout with detrited matter. These rafts in Marshall's bay were so numerous, that could they have melted as I saw them, the bottom of the sea would have produced a more curious study for the geologist than the boulder covered lines of our middle latitudes. One in particular had its origin in a valley where rounded fragments of water-washed green stone, had been poured out by the torrents and frozen into the coast ice of the belt. The attrition of subsequent matter had truncated the great egg-shaped rock, and worn its sides into a striated face whose scratches still indicated the line of water flow." (2d vol. 155.)

These fields of ice at times are of most enormous size, and Professor Maury, in referring to one, says:

"This drift carried a field of ice that covered an area of not less than 300,000 square miles, through a distance of 1000 miles to the south; and such a

field covering to the depth of seven feet, would weigh not less than 18,000,000,000 tons. This then is the quantity of solid matter that is drifted out of the Polar sea through one opening—Davis' strait alone, and during a part of the year only."

"In countries," says Sir Charles Lyell, "in high northern latitudes, like Spitzbergen, between 70° and 80° north, glaciers loaded with mud and rock descend to the sea, and there huge fragments of them float off and become icebergs. Scoresby counted 500 of these bergs, drifting along in latitude 69° and 70° north, which rose above the surface from the height of 100 to 200 feet, and measured from a few yards to a mile in circumference. Many of them were loaded with beds of earth and rock of such thickness that the weight was conjectured to be from 50,000 to 100,000 tons. Specimens of the rocks were obtained, and among them were granite, gneiss, mica-schist, clay slate, granular feld spar, and green stone. Such bergs must be of great magnitude, because the mass of ice below the level of the water is about eight times greater than that above. Wheresoever they are dissolved, it is evident that the 'moraine' will fall to the bottom of the sea." (Principles, 228.)

"In the year 1807, at the time of the bombardment of the Danish fleet, an English sloop of war, riding at anchor in the roads at Copenhagen, blew up. In 1844, or thirty-seven years afterwards, one of our divers, known to be a trustworthy man, went down to save whatever might yet remain in the shipwrecked vessel. He found the space between decks entire, but covered with blocks from 6 to 8 cubic feet in size, and some of them heaped one upon the other. He also affirmed that all the sunk ships which he had visited in the sound, were in like manner strewed over with blocks" [of stone]. (Principles, 232.)

"In March and April," says Professor A. Keith Johnston, "the spring months of the northern hemisphere, the arctic icebergs are observed in the north Atlantic to drift farther southward before they are dissolved than at any other season. They have been

found in the Gulf Stream as far south as latitude 40° 35′ rapidly dissolving with the heat of the current. On the 18th and 19th of April, the steamship Great Western encountered a field of ice, probably 100 miles in extent and from 2 to 4½ feet thick. Icebergs to the estimated number of 300 were seen from the same vessel, the largest of which was three fourths of a mile long, and the highest 100 feet above the level of the sea. In May, extensive fields of ice have been encountered by different vessels, carrying "plump seals" in considerable numbers. Icebergs are sometimes met with in latitude 42° north, and as this is within the space usually traversed in navigating the Atlantic, many vessels are lost every spring by coming in contact with them, or being shut up in floating icefields.

"Icebergs being less common in the South Atlantic, have often been mistaken for islands, and as such, inserted in the charts. An idea of the dangers to which vessels are exposed from ice islands may be formed from the account of Captain Weddel, in his voyage towards the south pole. "On the morning of the 12th, we had closed with a large ice island, and, in spite of all endeavors to avoid it, we continued approaching. At 10 o'clock it was within two ships' length, and from its peculiar shape threatened to overwhelm us, for the upper part of the side nearest to us, which was about 180 feet high, projected so much as would have admitted the brig's mast coming in contact with it underneath, and this over-hanging part was cracked from the top down to the water line. Within half an hour I had the appalling sight of the overwhelming mass immediately over our quarter deck, with the fearful sensation, that if our masts came in contact with it, the projecting part would fall upon us and sink both vessels." (Physical Atlas, 31.)

In the North Pacific icebergs are never seen. Behring's Strait is but a narrow pass, and through it the warm waters from the equator are so continually

running in, at the rapid rate of four miles an hour, as effectually to prohibit their egress from the polar sea. In the North Atlantic the ocean is narrow, hemmed in by the mutually approaching continents, and on that account the waters are kept perpetually warmed by the Gulf Stream. On that side of the equator, therefore, the ice-fields and bergs seldom descend as low as latitude 40°, their ordinary limit being the parallel of 42° north. On the south side of the equator, however, where the ocean is expanded, and the tropical waters have the opportunity of freely spreading themselves, and more readily mingling with the cold waters from the southern pole, the ices ascend nearer to the equator, and as far as latitude 36½° to 37° south. By a comparison between the narrow ocean of the north, and the less restricted ocean of the south, it is evident that broad and open oceans permit these icy travelers to make their longest voyages; and if there were but one great ocean, undivided by a continent such as America, that then these icebergs and fields of ice should approach equally near to the equator on both sides of it, and reach at times the parallels of 36½ and 37 degrees north as well as south.

We have, then, seen these bergs and fields in the Arctic basin, in the course of formation, loading themselves with the rocks of that region, oftentimes rounded, scratched, and polished. Again, we have seen them on the ocean, drifting towards the equator, and as they melted, raining down moraines in their path upon the briny bed below; and even found their boulders piled in heaps upon the decks of sunken vessels. Can the reader doubt as to the source

whence have come the boulders, erratics, and moraines of the existing continents? Between the hypothetical, slowly creeping *terrestrial* glacier, engendered by a fanciful Arctic winter of protracted length, reaching to the tropics, and the natural aquatic iceberg, annually repeating its interpretations, can he hesitate to discern their true paternity?

In both of our hemispheres the geologist finds these boulders, erratics, and moraines deposited as near to the equator as latitude 36½° and 37° north and south, without any difference on either side. Here unequivocal proof is furnished, that when this record was made there were Arctic ices and continents; that the ocean, upon which the icebergs and fields of ice were drifted, was then broad and expanded, without intervening continents to produce heated gulf streams in narrow basins, such as we have now; and that the currents of that ocean obeyed the same law that we now find ruling in our southern seas. This ancient state of things confirms, in a most remarkable manner, the Mosaic description of the ancient world; and if more carefully and in detail we visit the seats of these manifold witnesses, the conviction is firmly riveted that the primitive ocean was one and undivided, and extended from Eastern Asia over existing continents westward to the Pacific coasts of America. In presenting this testimony, to avoid cavil it is preferable that it should be placed before the reader exactly as it has been prepared by others. The geographer, Malte Brun, thus speaks of these boulders and moraines:

"The fragments of granite and other pure rocks,

thrown here and there upon *stratified* rocks, and even upon alluvial lands, exhibit a phenomenon as indisputable as it is astonishing. All the chains of Mount Jura, all the mountains which skirt the Alps, the hills, and even the plains of Germany and Italy, have blocks of granite scattered over them, frequently of huge dimensions. The same phenomenon is also repeated in the plains of Russia, Poland, Prussia, Denmark, and Sweden. From Holstein to Eastern Prussia, upon the alluvial lands of sand and clay, an immense number of blocks of granite are found. Near the island of Usedom many detached masses rise up from the bottom of the Baltic. We see the same thing in Scarnia and in Jutland, which are so full of these fragments that they use them for inclosures for houses and churches. In Lymford, a gulf of Jutland, and at some points on the western coast of that peninsula, sharp peaks of granite shoot up from the bottom of the sea. But what is most remarkable, is to see enormous masses of granite placed upon the summits of the calcareous mountains of Rettwick, of Roedaburg, and of Osmund, which are near 6,000 feet above the level of the sea, and which consequently are among the highest mountains in the north of Europe." (Vol. I., 90.)

"In the Carpathians," says Mons. Figuier, "and the Caucasus, the existence of ancient glaciers of great extent has also been observed. In the Sierra Nevada, in the south of Spain, mountains 11,000 feet high have been covered with ancient glaciers during the Quaternary Epoch." (World before the Deluge, 393.) This conclusion, it should be remembered, is solely attained by the actual presence of boulders and moraines.

Mr. Charles Darwin, a most accurate observer, but a firm believer in the glacial theory and period, writes:

"In Europe we have the plainest evidence of the cold period, from the western shores of Britain to the Oural range, and southward to the Pyrenees. In Asia, along the Himalaya at points 900 miles apart, glaciers have left the marks of their former low ascent; and in Sikkim, Dr. Hooker saw maize growing on gigantic ancient moraines.

"Looking to America, in the northern half, iceborne fragments of rock have been observed on the eastern side as far south as latitude 36° to 37°, and on the shores of the Pacific, where the climate is now so different, as far south as latitude 46° erratic boulders have been noticed on the Rocky Mountains. In Central Chili, I was astonished at the structure of a vast mound of detritus 800 feet in height, crossing a valley of the Andes; and this, I now feel convinced, was a gigantic moraine left far below any existing glacier. Farther south on both sides of the continent, from latitude 41° to the southernmost extremity, we have the clearest evidence of former glacial action, in huge boulders transported far from their parent source. We also have some direct evidence of former glacial action in New Zealand, and if one account which has been published can be trusted, we have direct evidence of glacial action in the south eastern corner of Australia." (Origin of Species, 324.)

As elucidatlng the whole subject, and more minutely the limits and phenomena in North America, we extract from an address of Professor Ed. Hitchcock, delivered in 1841 before the association of American Geologists, the following information:

"Until recently," says he, "I confess I have doubted, whether some of the most striking of these phenomena were not much more fully developed here than in most countries of Europe. I refer particularly to the smoothing, polishing, scratching and furrowing of the rocks in place, and to those accumulations of gravel, boulders and sand which form

conical and oblong tumuli, with tortuous ridges of the same, and which abound in the northern part of the country from Nova Scotia to the Rocky Mountains. But the recent investigations and accurate descriptions by Agassiz, Buckland, Lyell, Selfstroom and others, have satisfied me of the almost exact identity of the facts in relation to drift on the two continents. The resemblance, however, seems to be most complete in this respect between Scandinavia and this country. Except in Sweden, I have not yet seen evidence that the scarification of the rocks is as common in Europe as in New England, where, if they were denuded of soil, it seems to me one third of the surface would be found smoothed and furrowed. But it is now found to be very common in Scotland, England, and especially in Switzerland. It appears, too, that those countries abound in those peculiar accumulations of gravel and boulders, which are now regarded as ancient *moraines*. Boulders also appear to have been dispersed in a similar manner on both continents. In this country the principal mass of the drift consists of coarse sand, pebbles and boulders, often several feet in diameter, usually mixed together confusedly, but sometimes exhibiting, at least for small distances, more or less of a stratified arrangement. This mass of detritus, not unfrequently one hundred feet thick, occupies the lowest position, resting immediately on the smoothed and striated rocks in place.

"In New England we have been able to trace erratic blocks not more than one or two hundred miles, because we then reach the ocean. But in the central parts of the country, I am informed by Professor Mather, that the primary boulders from Canada and the western part of Michigan are found as far south as the Ohio river, which would make their maximum transit from four to five hundred miles; about the same distance as the boulders from Scandinavia have been carried into Germany.

"These phenomena must have been the result of some very general force or forces operating in the

same direction; that is, southerly or south-easterly. For in a southerly direction has the drift been so uniformly carried, and the furrows and scratches on the rocks so generally point southerly, over a breadth of nearly two thousand miles, that the force which produced these effects must have tended thither.

"This agency has operated at all altitudes, from the present sea level and probably beneath it, to the height of three or four thousand feet. In New England, most of our hills, and mountains, not excepting insulated peaks not higher than three thousand feet, are distinctly smoothed and furrowed on their tops and northern slopes, and upon their eastern and western flanks, to the bottom of the lowest valleys.

"The smoothing and furrowing of the rocks exhibits almost equal freshness at all altitudes, which indicates an approach to synchronism in the producing cause.

"The almost perfect parallelism preserved by the grooves and scratches over wide regions, shows that they were made by the projecting angles of very large and heavy masses, of great extent, moving over the surface with almost irresistible force by water or some other agent. There is sometimes more than one set of scratches, which intersect one another at a small angle, but each set preserves its parallelism most perfectly. Even where they pass over high and precipitous ridges, they are rarely turned out of their course.

"This agency appears to have been less and less powerful as we go southerly. We have had as yet, but few trusty reports on this subject from the southern portions of North America; but had the phenomena of drift been as striking there as in New England, New York, and Canada, they would certainly ere this have been described.

"The North American Continent must have attained *essentially* its present height above the ocean, previous to the exertion of this agency; for all our for-

mations, as high at least as the eocene tertiary, are covered with drift."

We thus find these monuments of the ancient ocean defining its extent over all the continents except Africa; and that reaches so little beyond the tropics, as to be wholly excluded from the path of the drifting icebergs, which necessarily melted before attaining its southern cape.

In the foregoing account there seems to be a piece of circumstantial testimony unfolded that is worthy of consideration. The ancient ocean had its equatorial current as our modern oceans have; and when the heated stream impinged upon the eastern shores of the Adamland, its waters were deflected, and turned to the arctic regions, as the Kamschatka current in the Pacific and the Gulf stream in the Atlantic at present do. These waters being warm on that side of the ancient continent, would melt the icebergs sooner, near the coast, than they would be dissolved by the cold waters at a greater distance. Mr. Darwin's statement affirms, that whilst on the eastern part of North America, then distant in the open ocean, the boulders are found as low as 36° and 37°—yet on the coast of California, then near the eastern shores of Adamland, the latitude of 46° seems to be their lowest limit, so far as ascertained. This fact would clearly indicate a broad ocean, with a large body of heated water flowing rapidly northward along the coast to melt the icebergs in so high a latitude.

Next, the question arises, when were these monuments erected, and to what period of time, before the Flood, are we to ascribe their deposition? The answer is not involved with the slightest difficulty, and

no doubt is entertained upon the subject. Although a difference of opinion may exist as to the mode of transportation, a perfect unanimity prevails as to the time of the transfer. All the scientific and learned, without an exception, judging from the appearances and conditions surrounding these erratics, affirm that this icy-cold period during which they were deposited, manifestly terminated *very shortly* before man appears to have come upon the scene of action; that man's advent was immediately preceded by this universal melting of the glaciers. From the physical features of the earth, presented in our preceding chapter, the reader may with facility form his own conclusions upon the subject. Vast numbers of these boulders were no doubt dropped even before Adam's day, and during the interval between his day and Noah's. Many, if not most of these, now lie hidden from view, buried deeply beneath the accumulations of shells and sands drifted by the sea. Some of them may have been upraised, with their calcareous beds, to crown the heights of Rettwick, of Roedaburg, of the Pyrenees and Himalaya; but as the largest number now visible, repose upon the alluvial plains of Europe and North America, themselves evidently the last sweepings of the primitive ocean, they must be ascribed to the days of the Flood itself. Then the lands and waters were in a revolutionary state; the foundations of the olden time were discomposed and sundered, and the primitive order of things subverted.

With the present world, which stands one thousand feet above the sea, and covers one-fourth the superficial area of the globe, submerged at the same time

with the Adamland, the ocean's surface would be raised two hundred and fifty feet above its common level. Such an increase in the height of the water, and even much less, even more than usual high tides, as Dr. Kane affirms, would be sufficient to lift and break all the icebergs and ice fields of both polar regions from their accustomed moorings, and fill the temperate zones with floating fields and mountains laden with moraines. As Asia, South America and Africa exceed eleven hundred feet in their general elevation, and North America and Europe are but seven hundred feet above the water, it is manifest that when the first three were raised entirely above the surface, the other two would still remain as parts of the ocean, convenient to the arctic regions, and consequently should have received, as they really did, by far the larger number of these superficial and visible boulders and erratics. These icebergs flowing southward, with their immense weight, would naturally score and polish all the rocky plains, and sides and tops of mountains, with which they would come in contact; and as the marks they bear are nearly of the same age, but some are several thousand feet higher than others, it is evident that when made the whole was undergoing upheaval, and that the mountains first received their furrows, and afterwards the plains, when sufficiently upraised to feel the iceberg's pressure. Thus may we conclude that these stony memorials were made in the most natural way, during the last days of the flood, and still remain as deposited, plainly to proclaim the fact. This view of the late deposition of these moraines is well supported by the order in the upheaval of the continents, as we

have already deduced as a fact, that the power and force was first exerted in the south, and last around the northern portions of the globe, where it produced a distended fullness.

Here, then, is a page in the great volume of nature, which, when interpreted by that other volume from the same Author's hand, becomes rationally intelligible and credible. No enlarged credulity is required to believe, that for myriads of years the sun's heat was withheld from the earth merely to scatter rocks about its surface; neither are we required to adopt as an article of faith, that these icy travelers should be so disregardful of the laws of gravity as to scale the lofty limestone mountains only to deposite granite boulders on their summits. Both volumes concur in the statement, that on the third day one continent of "dry land" appeared, "standing in the water and out of the water," and that in Noah's day "it perished;" and that then emerged from the deep the present continents, with their faces marked and freckled with boulders, erratics and moraines. This simple creed is certainly less free from the charge of gross credulity than that of the vaunted Glacial theory, and it requires no over-heated zeal to render it acceptable; and we may here confidently insist, that this page in the book of nature the philosopher has undoubtedly misinterpreted, and that only for the reason assigned by Saint Peter eighteen hundred years ago.

These "boulders, erratics and moraines," then, are clearly discerned to be the Lord's witnesses, erected by his obedient servitors. And whilst the mounds, cromlechs, cairns tables of stone, pyramids and

towers, can only say that man has been present where they stand, and possibly indicate the line of his migrations, those ancient witnesses of the Lord—with their modern expositors annually thrusting themselves across the path of man's commercial arks, inviting and demanding an examination of their powers and their duties, their structure and their loads—loudly and explicitly proclaim the infallible verity of the sacred page. Can or ought man to ask or desire stronger and more convincing proof that the earth we live upon was once a broad ocean's bed, and that the earth "that then was, absolutely perished," submerged beneath the detaining waters of an Universal Flood?

CHAPTER III.

"The tinted sea-shell, borne away
Far from the ocean's pebbly shore,
Still loves to hum the choral lay
The whispering mermaids taught of yore."

THAT the existing continents, prior to the flood, were covered by the antediluvian ocean, is a fact susceptible of the clearest and most satisfactory proof, and one about which not the slightest doubt would be entertained but for the sophisticated hypotheses of the geological school. These, from first small erroneous beginnings, have grown, by the gradual addi-

tion of false assumptions, into a body of startling tenets actually staggering to the sober mind, and incompatible with sound reason. So general are the evidences throughout Europe that the several stratifications of the earth were originally distributed by the agency of water, that Werner of Freyburg, in Germany, presented as the first modern geological theory, that the whole earth was, in the beginning, a chaotic pasty fluid, from which were sucessively precipitated the slates, limestones, sandstones and other strata that lie upon each other. This school acquired the name of Neptunists. Others, following his lead, soon discovered that there were lavas, crystaline rocks and other formations inconsistent with Werner's views, and such as could only have resulted from actual fusion from intense heat. These insisted that the earth was originally in a melted state, and attempted to explain all physical phenomena by the agency of fire. A war at once commenced between the Plutonists and Neptunists—the one fighting with fire, and the other defending themselves with water. This, like all other belligerent contests, ended in a compromise with mutual losses and concessions. Sprung from a forced union, the geologists of later days, as an eclectic school, invoke the aid of fire or water, as the occasion may require, to explain physical phenomena, but cannot always refrain from referring to some of the teachings of their predecessors as "fanciful speculations that amused their minds." The eclectics take the earth rather in detail, and without attempting to explain the special agencies and forces that produced each part, are simply content to fix its age, which they generally do very satisfactorily, with

in a million or two of years, according to a scale which they have fancifully adopted as infallibly correct. Though nowhere expressly stated, or prominently presented, their whole system is based upon the fundamental fact, that before the present "dry land" appeared, the whole earth was one universal ocean, such as it was, according to the scriptures, in Noah's day. They, however, ignoring the Flood, and repudiating every idea of convulsive cataclysms, insist that all the continents and islands "have originated from slow and insensible upheavals from the submarine abyss, continued throughout incalculable periods of time;" and they urge, as "one of the soundest objections to the sudden upthrow of continental masses, that it deprives them of that great power so necessary to account for the external configuration of every island and continent."* The necessary power has, however, been exerted, for the continents and islands have been upheaved, and still stand to prove it; and the geologist conceives that the whole has been accomplished by some "one horse power," whose energies, for a succession of upward movements, have been prolonged throughout indefinite periods. All the continents, however, are finished off in like manner, with the same exhibition of marine shells and deposits, and all covered alike with alluvial sands, clays and earths, that attest a sameness in the times and agencies producing them. These upper and superficial strata, the geologist admits, were all fashioned and finished shortly before man appears to have come upon the scene of action, notwithstanding the feeble powers of the horse.

* Lyell's Principles, 166.

The scriptural doctrine, more consistently with natural phenomena, teaches that the present masses were all upheaved within the limits of a year, and at once meets the soundest objection of the geologist, by furnishing the necessary and adequate power for such a purpose. This force, induced and irregularly exerted by a subsiding world, with the ocean currents of that year, is fully sufficient to explain every physical and fossil feature of the globe, and is comprehensible; but it is not conceivable from what particular source even a one-horse power is derived by the geologist, much less why its powers at different times were so unequally exerted as now to produce Asiatic masses, and again, African or American plains.

If we accept the facts collated by geologists as reliable, but reject their conclusions as fanciful and unsound, this page in the book of nature becomes perfectly intelligible. The old sea-bed should seem as such, making a due allowance for the distribution of its former tenants, and their inhumation beneath the sands and clays, that were mingled with, and borne to different parts and distances by, the flowing waters. A brief examination can only be indulged, but that will sufficiently illustrate the subject.

There is a particular class of marine shells of a thin lenticular shape, which from their resemblance to coin, and from their use as a currency by some nations, have acquired the name of "nummulites," or stone money. The "nummulitic" formation holds a very prominent position in the science of fossils, is extensively distributed over the continents, attaining in some places a thickness of many thousand feet, and

extending in a continuous line from Western Europe to Eastern Asia. Throughout NorthernAfrica, in Algeria, Morocco and Egypt, it is found abundantly. From the Alps to the Appenines, and thence to the Carpathians, it traverses the breadth of Europe, and is traced eastwardly into Asia Minor, and across Persia to the mouth of the Indus. It occurs also in Cutch, and in the mountain ranges which separate Scinde from Persia, and has been followed still farther eastward in India.* Here, then, entirely across the eastern hemisphere, are preserved in one broad continuous line the witnesses of the ancient sea. But not to confine ourselves to the nummulites, we find similar testimonies almost universally existing. In Asia, upon the Himalaya range, marine shells still remain at an elevation of 16,000 feet above the level of the sea. The ark rested, most probably, upon a heavy bed of oyster shells, as all the regions about the Caspian sea, as Caucasus, Taurus and Libanus, bear upon their brows, at a height above the clouds, abundant relics of these ancient bivalves. Northern Asia is equally as explicit as the southern portion in its testimony, for the traveler finds molluscous memorials upon the plains of Siberia, and the Jesuit affirms that the mountains of China are covered with them.

Europe everywhere preserves enduring monuments of the antediluvian sea. In Denmark, Norway, and in Sweden, at an elevation of 3000 feet, immense beds of shells are found. The whole of Germany speaks to the same effect, for there is no portion of it in which calcareous marls do not exist, furnishing

* Lyell's Manual, 206.

belemnites, ammonites, encrinites, and other ancient forms. Greece, Italy, France and Spain, once thronged with such teeming numbers of testacea, that their densely packed cemeteries are excavated into extensive cities for the reception and repose of the inanimate forms of men. In France extensive beds of broken shells exist, comprising even square leagues in extent, as in the vicinity of Touraine. From Chalons to Rheims, the soil is interspersed with belemnites, pectines and the teeth of fishes. From Rethel through the departments of the Maine and the Aube, towards Sens, banks of calcareous shells are found; and in the canton of Courtagnon a vast variety, covering a broad extent, still preserve entire the primitive forms, with shining colors and enameled polish. The Paris basin vehemently contends with the ancient troughs of the British isles for supremacy in the possession of fossil treasures. In Spain, as well as in France, in Italy and Greece, the traveler often pursues his way over roads of exposed shells, and even if he ascend the mountains, he finds them upon the Pyrenees, upon the summit of Mount Perdu at the height of 10,000 feet, upon the Dauphinese Alps at 7,400, and upon Mount Ventoux and the Alps of Savoy at 6,000 feet above the sea.

Northern Africa is thus described by Hugh Miller:*

"For nearly three hundred miles, from the inner boundaries of the Delta to within a few hours journey of the cataracts—the silt and sand rest on what is known as the marine or nummulitic limestone, a formation of great extent, for it runs into the Nubian desert on the one hand, and into the Lybian desert on the other; and which, though it abounds in the

* Testimony of Rocks 419.

animalcules of the European chalk, is held to belong, in at least its upper beds which are charged with nummulites, to the earlier eocene. Over this marine limestone, there rests a newer formation of later tertiary age, which contains the casts of sea shells, and whole forests of dicotyledonous trees, converted into a flint-like chest; and over all repose the sands and gravels of the desert. Underneath the silt of the river, then, and the sand of the desert, lie these two formations of the tertiary division. The lower, which is of great thickness, must have been of slow formation.* It is composed, almost exclusively in many parts, of microscopic animals, and abounds in others in fossil shells, nautili, ostreadæ, turritella and nummulites, with corals, sponges, the remains of crustacea and the teeth of fishes."

The western hemisphere is by no means behind the eastern in its revelations. The whole eastern and southern coasts, up to the falls of the rivers, abound in accumulations of shells. These, at first thin and rare, increase in breadth and depth from Delaware and New Jersey, southwardly through Virginia, the Carolinas, and Georgia; and they are extensively continued in Alabama, Mississippi, Louisiana, and Texas. Even in Arkansas, upon the tributaries of the Washita, the ancient forms abound, and in the bed of Saline river, Mr. Featherstonhaugh discovered immense quantities of oyster shells imbedded in a calcareous rock. He also procured from the carboniferous limestone of Tennessee, Kentucky, Indiana, and Illinois, a rich collection of fossils, which he enumerates as identical with the European species. Subsequent researches northwards, even far into Canada, have resulted in similar dis-

* He should rather have said rapid formation, as the most natural conclusion from his facts.

coveries. In South America the same mementos exist, and Humboldt affirms that the high peaks of the Andes, at an elevation of 13,200 feet, are covered with shells of the oyster.

The shells thus far alluded to still retain their pristine forms, and are sufficiently large and well defined to be readily distinguished and designated by learned names. They are often found in great and confused heaps, broken, and the parts and valves separated from each other as if they had been transported and promiscuously mingled together. In their midst are frequently found interstratified foreign matters, clay, sand, ores of iron, copper, quicksilver, and other metals; the teeth and bones of rays, sharks, whales and other creatures, and even the trunks, twigs and leaves of plants, shrubs and trees. All these shells, however, differ from the species now inhabiting the seas in and around the continents, and from this fact, the geologist asserts that they are extinct; that they were all blasted and annihilated by the extreme cold of the "glacial period," and that the existing races have been subsequently created.

There are, however, other witnesses of the universal Flood more widely and uniformly distributed. The sea had its insects, as well as the land and the atmosphere, and these then, as now, occupied more space for interment than the largest races. All the marbles, limestones, chalk, plaster or gypsum, are composed of the microscopic exuviæ, of the former insects of the ancient deep. As to their wide distribution over the continents, Professor Maury's researches in our present oceans prove highly instructive.

"Here again" says he, "we perceive these little conservators of the sea at work. This specimen, that Brooke has obtained for us, comes from the coral regions, and the task of secreting the calcareous matter from the sea-water, appears to have been left by these little mites of creatures to the madrepore and shell fish, while these mites themselves undertook the hard task of getting the silicious matter out. The division of labor among the organisms of the sea is wonderful. It is a great workshop, in which the machinery is so perfect that nothing ever goes wrong.

"We have now had specimens from the bottom of blue water, in the narrow coral sea, the broad Pacific and the long Atlantic, and they all tell the same story, namely, that the bed of the ocean is a vast cemetery. The ocean's bed has been found everywhere, wherever Brooke's sounding rod has touched, to be soft, consisting almost entirely of the remains of infusoria. The Gulf stream has literally strewed the bottom of the Atlantic with these microscopic shells; for the coast survey has caught up the same infusoria in the Gulf of Mexico, and at the bottom of the Gulf stream off the shores of the Carolinas, that Brooke's apparatus brought up from the bottom of the Atlantic off the Irish coast.

"The unabraded appearance of these shells, and the almost total absence of the mixture of any detritus from the sea, or foreign matter, suggest most forcibly the idea of perfect repose at the bottom of the sea.

"Some of the specimens that Brooke has brought up are as pure and as free from the sand of the sea as the snowflake that falls, when it is calm upon the lea, is from the dust of the earth. Indeed these soundings suggest the idea that the sea, like the snow-cloud, with its flakes in a calm, is always letting fall upon its bed showers of these microscopic shells, and we may readily imagine that the "sunless wrecks" which strew its bottom are, in the process of ages, hid under this fleecy covering, presenting the rounded appearance which is seen over the body of

the traveler who has perished in the snow storm. The ocean, especially within and near the tropics, swarms with life. The remains of its myriads of moving things are conveyed by currents and scattered and lodged in the course of time all over its bottom. This process, continued for ages, has covered the depths of the ocean as with a mantle, consisting of organisms as delicate as the macled frost, and as light as the undrifted snow-flake on the mountain."—(Phys. Geog. Sea, 265.)

As the floor of the antediluvian ocean was of a uniform character, without submarine shoals or mountains, and corresponding abysses, to induce strong contrasts in the climates of the seas, the tenants of the deep were then undoubtedly more prolific than at present, and multiplied as rapidly as the inhabitants of the land. There were in those days, it has been held, no carnivorous or predatory fishes, as none appear to have had the hard, large conical and pointed teeth, that would indicate such natures. Their cemeteries, too, are extensive and world-wide, and sufficiently attest the genial condition and life-giving character of the ancient waters.

It is well known that sand or flint, boiled with an alkali, lime, potash or soda, produces a solution of soluble silica, that binds inseparably other calcareous and silicious matters together; and it is also known, that it is to certain elements contained in volcanic lava, that Roman cement is indebted for its hydraulic properties, which enables it, in the shortest time, to set and harden even under water. By one or both of these agencies combined, the slates, sandstones and conglomerates were, no doubt, united and bound together, "when all the fountains of the deep were bro-

ken up," and not only the volcanoes were erecting their cones, but innumerable trap dikes, through smaller fissures in the crust of the earth, were diffusing the cementing properties of lava throughout the flowing waters. Especially would this be the case, in deep basins, saddle-shaped troughs, and other cavities, where not only the concreted rocks but the cementing dikes abound. A few days, instead of millions of years, would only be requisite to convert sands into stones, and pebbles into conglomerates. Time and pressure, of themselves, could accomplish nothing of the kind; for in fact it is the acknowledged prerogative of time to untie all the ligaments that bind atoms together, whether organic or inorganic.

The microscopic shells of the olden time are found to have been consolidated and cemented together, and in many places metamorphosed by heat into the different kinds of marble. Such is the origin of all chalk, gypsum, limestones and marbles; the degree of heat, imparted to the mass in each case, having defined its character as to color, texture, and the partial or total destruction of the vegetable or bituminous matter with which it may at first have been impregnated. The various beds, however, disclose, that when the microscopic bodies were drifted to their present sites there was more commotion in the waters than Prof. Maury finds on the bottom of our present seas. The currents then were charged with sand, clays, larger shells and vegetable limbs, twigs and leaves, and occasionally an elephant. In the soft chalk are found nodules of flint; in the harder limestone are found clay, sand, the larger ammonites, belemnites, etc., with various minerals, such as serpen-

tine, talc, garnet, hornblende, epidote, chlorite, felspar, mica, spinel, corundum, phosphate of lime, oxide of iron, sulphur and the sulphuret of iron, etc. The finest Carara marble, procured for statuary purposes from the Apuan Alps, often exhibits blackish veins and flakes of graphite, with nodules of ironstone, lined with transparent crystals of quartz. Mica, finely comminuted, is a very common accompaniment of marble, and imparts to it various colors and shades, as red, green, or yellow. These foreign ingredients are not promiscuously mingled with and through the mass, but are generally interleaved as veins or thin layers; and, again, these diminutive shells themselves are oftentimes diffused as thin seams of lime between the laminæ of slates.

Chalk and the various kinds of limestone prevail throughout the eastern hemisphere in the greatest abundance. True they are not everywhere alike, but their differences have chiefly resulted from the different degrees of heat to which they have severally been subjected, and not to any particular ages in which they lived and died.

In the western hemisphere, the limestone formation is remarkably and continuously extensive. Mr. Featherstonhaugh, in his report to the Congress of the United States in 1835, says: "One of the most remarkable geological features of this continent is the vast extent of the carboniferous limestone. I have traced its eastern border, conforming to the course of the other mineral formations east of the Mississippi, more than 1,000 miles, running to the west of south, from the state of New York to the thirty-fifth degree of north latitude in the state of

Alabama; the course is then changed, and lies to the north of west, leaving Little Rock on the Arkansas about 30 miles to the south, and disappearing between 500 and 600 miles from the Rocky Mountains. This deposit extends, uninterruptedly, a geographical distance of at least 1,500 miles from east to west, underlying portions of the States of New York, Pennsylvania, Ohio, Indiana, Illinois, Missouri, and the Territory of Arkansas, on that line. In Tennessee, Kentucky, Virginia and Maryland, it is bounded by a line of which the Cumberland Mountains form a part. In the plains through which the Mississippi flows, and which include the Illinois prairies, it appears like a continuous floor, forming an almost unvarying flat; for although the superficial level is irregular, that of the calcareous formation, lying beneath the arable soil, seldom seems to change its elevation materially." (28)

Thus, from the Blue Ridge westward to near the base of the Rocky Mountains, do the insects of the ancient seas lie entombed in heavy, continuous compact masses; and outside these limits it is known that their burial-ground extends northwards far into Canada. South America has been less carefully explored than the northern part of the continent, yet in various parts of it, as well west as east of the Andes, calcareous remains are reported as abounding.

Extensively as these beds prevail throughout all the continents, it is seldom that any spacious fields are exposed to view. They are almost everywhere covered with earths and soils, and, at times, to very great depths. This covering the geologist calls "*alluvium*," from "*alluo*," to wash, on account of its re-

semblance to the deposits made by flowing or running water, and it is found in every part of the earth, from the equator to the poles. Now, sundry pertinent questions arise demanding geological solution. Whence did the sea procure all this alluvial earth, wherewith to cover the continents? Not certainly from its own bed, for that was frosted over with the snow-flake forms of its dead. Did it require countless and interminable ages for its accumulation? where were the tenants of the deep during that protracted time, that none died and left their remains to mingle with this alluvial earth? Here, according to the geological theory, was a grand void for untold ages, a world without an organic thing of life, waiting for earth wherewith to bury the former dead, and no imaginable source from which it could possibly come. Sir Charles Lyell, when speculating upon the quarter whence could have been derived a sufficiency of earth to form the Wealden strata of England, admits his embarrassment, and acknowledges that he is half disposed to believe in the former existence and washing away of Plato's Island of Atlantis. The Wealden, however, is but a speck when compared with the alluvium that invests all the continents, and yet the latter has never been attended with the least perplexity. The scriptural explanation is, however, full and satisfactory, and only requires a twelvemonth for its consummation.

An alluvial appearance is often manifested in the very midst of the primitive granitic mountains. When the crust of the earth was violently ruptured and upheaved, myriads of fragments, great and small, were severed from the mass and drifted away by the cur-

rents. These are found in the plains and valleys, sometimes re-cemented together, and form what is known as "recent granite;" and again, they are found interspersed in the body of laminated slates, composed of finely comminuted particles of mica and sand, or clay, and yet very readily distinguishable as granitic fragments. These slates, thus compounded, not unfrequently exhibit furrows, as if produced by running water, which no doubt were made before the particles were cemented and consolidated into stone.

Hitherto we have alluded only to the molluscous and testaceous fishes of the sea; but there are many specimens of the finny tribes preserved in the treasure caves of the primitive ocean, which tell the tale, that when they lived they were myriads in number, and many of them giants in size. Cuvier first divided these ancient fishes into two classes, but this "failed to meet any corresponding arrangement in the course of geological history; and it was not until Mons. Agassiz furnished a new classification, that the correspondence became complete in all its parts.

First, he erected the fishes that to an internal cartiliginous skeleton unite an external armature of plates and points of bone, into his *placoid* order. This class of fishes may be considered as represented by the "*dog fishes*" of our coasts, and perhaps better by the *Port Jackson shark*, a creature that to the dorsal spines and shagreen covered skin of the dog fish, has his mouth, not beneath his jaws, like other sharks, but at the end of his snout, and a palate covered with a dense pavement of crushing teeth.

Next, he erected all the fishes that are covered,

whatever the consistency of their skeletons, by a continuous or nearly continuous armor of enamelled bone, or by great bony plates that lock into each other at their edges, into his *ganoid* order. Of this class the *sturgeons* and *herrings* are the modern representatives. Third, those fishes whose scales are pectinated at their lower edges like the teeth of a comb, are classed as *ctenoids*, and are represented by our *perches*. Lastly, those whose scales are defined all around by a simple continuous margin, are all called *cycloids*, and constituted the ancient *salmon*.

"The earliest fishes," says Hugh Miller, "*first born* of their family, seem to have been *all placoids*. The silurian system has not yet afforded a trace of any other vertebral animal. With the Old Red Sandstone, the *ganoids* were ushered upon the scene in amazing abundance; and for untold ages, comprising *mayhap millions* of years, the *entire* ichthyic class consisted, so far as is yet known, of *but these two orders*. During the time of the Old Red Sandstone, of the Carboniferous, of the Permian, of the Triassic and of the Oolitic systems, all fishes, though apparently as *numerous individually* as they are now, were comprised in the ganoidal and placoidal orders. At length, during the ages of the chalk, the cycloids and ctenoids were ushered in, and were gradually developed in creation until the human period, in which they seem to have reached their culminating point, and now many times exceed in number and importance all other fishes. I may here mention, that as there are orders of plants, such as the rosaceæ and the grasses, that scarce preceded man in their appearance, so there are families of fishes that seem peculiarly to *belong to the human period*. Of these there is a family very familiar on *our coasts*, and which, though it furnishes none of our higher ichthyic luxuries is remarkable for the numbers of the human family which it provides with a wholesome and palata-

ble food. The families to which the delicate salmon and turbot belong, were ushered into being as early as the time of the chalk; but the cod family, to which belong the cod proper, the haddock, the whiting, the coal-fish, the pollock, the hake and the ling, with many other useful and wholesome species, did not precede man by at least any period of time appreciable to the geologist. No trace of the family has yet been detected, in even the tertiary rocks."*

In this condensed view of the scientific theory in relation to the fishes, there is a singular misapplication of terms, a total ignoring of the ways and habits of the finny tribes, a repudiation of the laws of nature, and an unwarranted conclusion from the ascertained facts. The ushering out of existence is fancifully termed, ushering into being: the death and burial being assumed as the time of birth. Certain fishes are found entombed in an ancient ravine in the sea, and it at once is concluded and announced that they were the only tenants in an universal ocean; that elsewhere there were no perches, nor salmon; no coasts around which the cod and haddock were offering their ichthyic luxuries, for millions of years; and that these and all other varieties and species, are not, as they should *naturally* be, found in the same small cemetery, comprising perhaps the area of a few square leagues. The reader unacquainted with geological terms should understand, that the different strata named above are generally found in a few great basins, or saddle shaped troughs, arranged one above the other. The silurian, or lowest, resting upon the ancient granite,

* Testimony of Rocks, 92.

are chiefly composed of fine clays, consolidated into slates. Above this are found the Old Red Sandstone, which, as its name implies, consists of sand and pebble, cemented together, and colored probably with the red oxide or salts of iron. Next above is the carboniferous formation, in which strata of coal are imbedded in the midst of alternating layers of sand and clay, an occasional bed of limestone, and sometimes with a seam containing nodules of argillaceous iron ore. Above these, in successive order, are the Permian beds, the Triassic and Oolitic, still composed of the remains of marine insects, or limestone, of sands and clays, and chiefly differing from the former in the character of fossils they yield, so as to afford a method of classification. Above the last named, sometimes the cretaceous deposit, or chalk, is found, and lastly the whole is covered by the tertiary earth, or widely diffused alluvium. These basins and troughs are found in England, Scotland, Russia, France, and in the more northern parts of the United States, but never in any two places alike. In some, one or more, beds are entirely wanting, and in others there are such differences as make it doubtful whether they are entitled to the ordinary classification.

It is in the silurian, or lowest clay deposit, that the ancient dog fish, or Port Jackson shark, are found, though their remains are but few. In the strata above, especially in the Old Red Sandstone, the herring tribes are buried in prodigious numbers; and it is conceived that to fill this portion of these basins, by any agencies now known or in operation, millions of years would be requisite. In other words,

it is assumed, that as things are now, so have they ever been, even from the beginning.

The transporting power of water is much greater than is generally supposed, and therefore its agency, during the Flood, may not be fully appreciated. By way of illustration, an instance or two of its operations will aid the reader in forming an estimate of its capacity. Sir Charles Lyell recites, that at the mouth of a river in Nova Scotia, a schooner of thirty-two tons, laden with live stock, was lying with her side to the tide, when the "bore," or tidal wave, which rises there about ten feet in perpendicular height, rushed into the estuary and overturned the vessel, so that it instantly disappeared. After the tide had ebbed, the schooner was so totally buried in the sand that the taffrail, or upper rail over the stern, was alone visible.* These sands, and all that are now extending over our southern capes, and closing our southern inlets, are derived from the polar regions, brought down by the cold currents that flow along our eastern coast, as ascertained by Professor Maury. The Ganges is one of the large rivers of the earth, and Sir Charles Lyell estimates that in the four months of the rainy season it annually transports to its mouth three hundred and forty millions of tons of mud; an amount equal to the mass of fifty-six and a half of the greatest of the pyramids of Egypt, which covers eleven acres of ground, and is five hundred feet in height. To present some conception of the mighty scale of this operation, so tranquilly and almost insensibly carried on by the Ganges, he states, that if a fleet of more than eighty Indiamen, each freighted with

* Principles, 735.

about fourteen hundred tons weight of mud, were to sail down the river every hour of every day and night for four months continually, they would only transport from the higher country to the sea a mass of solid matter equal to that borne down by the Ganges in the four months of the flood season; or the exertions of a fleet of about two thousand such ships, going down daily with the same burden, and discharging it into the gulf, would be no more than equivalent to the operations of the great river. Yet, in addition to this, it is probable that the Brahmapootra conveys annually as much solid matter to the sea as the Ganges.*

Notwithstanding the deposits of the ancient basins may be of very great magnitude, we may readily perceive that such tides as the Nova Scotian, or such rivers as the Ganges and Brahmapootra, would furnish an adequate supply of material in much less time than a million of years; yet these rivers would be esteemed but as rivulets, when compared with the majestic equatorial river that encompassed the whole earth in the days of the universal ocean, and by which the various sediments were then transported and distributed. Rivers, however, do not carry to the same distance all the matters with which they are freighted, but their capacity is controlled by an established law. It is well settled, that a speed in a current of three inches per second is requisite for the movement of clay; that a velocity of six inches will bear away ordinary sand; of eight inches, sand as coarse as flaxseed; of twelve inches, will sweep along gravel; of twenty-four inches, will roll

* Principles, 272.

pebbles an inch in diameter; and that a velocity of thirty-six inches per second is requisite to bear away shivery angular stones of the size of an egg. The equatorial currents, leaving the tropics with the highest velocity, yet gradually diminishing towards the poles, would first drop the heavier matters, and afterwards successively the lighter, as its speed decreased. In accordance with this law are the sedimentary elements distributed over the earth. Around the northern portions of the globe, the silurian slates, composed of the lighter clays, everywhere abound. Farther south are the pebbles and sandstones; and as we approach the tropics, the beds of fossil shells, and heavier matters, as well as the alluvium itself, regularly increase in bulk and depth. In New Jersey and Delaware, the beds of loose shells, or *shell* marl, are wanting, or nearly so; in Virginia they attain a thickness of fifteen feet; in North Carolina, twenty to twenty-five; but in South Carolina they are found from thirty to one hundred feet in depth. This simple law of running water, considered in connection with the ocean currents, well discloses the source of the sedimentary strata, and satisfactorily establishes that no protracted ages were necessary for their distribution, when so powerful an agent was engaged in the service.

Wherever submarine volcanoes occur, the ocean is seen to boil with violence; scoriæ of a chocolate color, cinders and dead fish, float upon the surface, and the waters are tinged of a dingy red. In the silurian and carboniferous basins the various strata are vertically interlaced with numerous trap dikes, or veins of lava, which, through narrow fissures, have

been ejected from below, and at times come up to the surface. These, at a former period, or perhaps at different times, were submarine volcanoes, which cemented the matters together and imparted to the sandstones their dingy red color.

Fishes are of very different natures, inhabiting different parts of the watery element. Some remain in the deep and open sea, others in the shallows; some remain permanently in rivers, and others leave the salt water to spend a portion of their time in the continental streams. The herring is a deep-sea fish, of a very prolific nature, taking its name from the German "heer," which signifies an army. It is supposed that they spend their winters in the comfortable regions around the north pole, from whence, in May or June, they visit the coasts of Europe, descending as far as France; and in America, as far as North Carolina. This, however, is only the pioneer force, for about the end of June other great shoals appear towards the extremity of the Shetland Islands, rippling the ocean's surface over a broad extent of many hundred miles. Gulls and gannets, screeching with delight, whales and porpoises, rolling and tumbling, announce their approach, and even the sailors and fishermen aver that their strong oily odor may be detected at a distance. After reaching the Shetland Isles they divide into separate armies, some turning to the eastern coasts of Scotland, Ireland and England, and others taking to the western side, and many, crossing the German Ocean, enter the Baltic. After much shifting and reconnoitering, they at length select the spot where they intend to spawn, and there they remain until the object of their migration is accom-

plished, during the winter. All herrings are not alike, even those from the same great shoal that turned to the east, evincing a different development from those on the west. Should one or more of these multitudinous hosts have been passing over or reconnoitering through any of the ancient carboniferous basins, about the time of a submarine eruption, they would at once have been killed, and buried in the drifting sediments. Such a catastrophe would furnish the evidence to sustain the geological statement that the individuals of the primitive ocean were extremely numerous, but confined to the ganoid class. And it would appear, too, as probable, that there were some, or at least one, carnivorous race in the ancient sea; for the tombs of the placoid sharks are significantly near the graves of the ganoid herrings. In such an assemblage as that described, and in that season, we certainly should not expect to find the ctenoid perches or the cycloid salmon; yet at another and later day they came, were surprised and killed in like manner, and were entombed beneath the light snow-flake bodies of the insect tribe, then drifting with the current of the seas.

These antediluvian fishes differed from those of the present time in many respects, yet not in such a degree but that they may be accepted as correlatives of each other. This, however, is but reasonable and natural; for if a change of worlds would induce a change in the organization of inhabitants, a change in the climates and conditions of the ocean should equally secure a modification of form in the tenants of the deep. The fossils reveal that this alteration occurred "shortly before man came upon the scene

of action," or, more accurately, before he impressed his footprints upon the present continents. Professor Agassiz is the acknowledged leader in the science of ichthyology, and it is remarkable how accurately and carefully he has read the natures and adaptations of these pristine fishes. True he is impressed with the prevailing idea that the present dry land and seas received the terrestrial and aquatic races as they were created, and that it took untold ages to mould it into its present shape. Yet, notwithstanding, from the peculiar form and organization of the ancient races, he is enabled to see and say, that when they lived there was but little variety among the animals, arising from the peculiar configuration of the globe; that then there were no great mountains, no lofty elevations, nor deep depressions. Between the different zones and continents no such strange contrasts of the different types existed as at the present epoch. The same genera, and often the same species, were found in the seas of America, Europe, Asia, Africa and New Holland, from which we must conclude that the climate was much more uniform than at the present day.*

This page in nature's volume, read by divine light, becomes plain, comprehensible and rational. Through it we learn that, in Noah's day, there occurred a great cataclysm by which the former dry land was changed to sea, and the ancient bed of the sea converted into dry land. Look where we will, over the broad continents, from pole to pole, upon the mountain top, or on the plain, in the deep recesses of the earth, or upon its convex hills, and everywhere this

* Principles of Zoology, p. 227.

statement is so thoroughly and clearly affirmed, that he who runs may read it. Physical features and fossils, even the pebbles and alluvial sands, attest the absolute verity of the fact, and by their very position indicate and maintain the potency and adequacy of the power that accomplished the grand conversion. All the parts accord together, and the varied details combined, present an array of testimony which, in its fullness and completeness, is truly irresistible.

CHAPTER IV.

O Chemistry!
Come with all thy pervading gases,
Thy crucibles, retorts and glasses,
Thy fearful energies and wonders,
Thy dazzling lights and mimic thunders.

H. LUTTREL.

THE parts of the earth's surface that exhibit the primitive rocky crust of the globe, divested of all superficial covering, are comparatively very few and chiefly confined to mountainous and granitic regions. Nearly the whole of our continents are invested with an alluvium, varying in depth, and generally consisting of uncemented sands, gravel, and clays, sometimes separated and arranged in horizontal layers, and at others promiscuously commingled and blended together. The upper portion of this alluvium is denominated the soil, and from it the members of the vegetable kingdom derive all their earthy ele-

ments. The constituents of plants, by the agricultural chemist have been found to be very numerous, consisting of various kinds of salts; and examinations of the soil have also disclosed that they exist within it as parts of its composition. The question has been often asked, whence have come these alluvial earths and soils, and whence did they obtain these valuable ingredients? and the answer has as often been, that heat and cold, frost and snow, have disintegrated the original granite rocks, and converted them into alluvium, which in some cases retains its primitive position, and in others, by floods and rains have been borne away from higher to lower levels.

This view of the subject is, however, fallacious; for in very many places these alluvial earths are several hundred feet in depth, and are separated from the primitive crust by intervening layers of slates or limestones, so that it is impossible that the soil could have been formed in its present position. Neither could they have come, in such regions, from the ranges of mountains, which are not only extremely distant, but impassably separated by intermediate obstructions. And further, a comparison of their respective ingredients show that soils have not resulted simply from the dissolution of our primitive rocks, for the former contain many necessary and valuable elements which are not found in the latter.

Professor James F. W. Johnston, in his Agricultural Chemistry, furnishes the analyses of divers soils, taken from Europe and America, and in them finds the following elements, combined in various proportions:

Silica and fine sand . .	Silicates of potash.
Alumina	do " soda.
Oxides of iron . . .	do " magnesia.
do of magnesia . .	Phosphates of lime.
Carbonates of lime . .	" " iron.
" " magnesia .	Sulphates of lime.
Chloride of sodium or . .	" " potash.
Common salt . . .	" " soda.

In this list are found several ingredients, such as the phosphates and chlorides, that have never been detected in any granitic or primitive rocks whatever; and in other soils not included in these analyses, many salts exist, such as the muriates, hydriodates, oxalates, malates, &c., with compounds of iodine and bromine, which are also wanting in the truly primitive strata.

To discover the source of these, we are forced to turn to the ocean. *Sea water* alone furnishes many, but not all of them. This, according to the analysis of Dr. Ure, contains in 1000 parts—

Chloride of sodium	25.0
Suphate of magnesia . . .	5.3
Chloride of "	3.5
Carbonate of lime and magnesia .	0.2
Sulphate of lime	0.1

besides $\frac{11}{2000}$ of sulphate and muriate of potash, and portions of iodide of sodium, and bromide of magnesium.

The deficiencies not supplied by the waters of the ocean, are abundantly found in the organic members of the marine kingdom. The bodies and offal of all fishes, from the great whale to the sea-mite, are replete with the fertilizing principles found in the soils, and the ancient ocean was crowded with their teem-

ing numbers. The aquatic plants and vegetable forms that densely grew in the more shoaly portions of the sea, and then, as now, in immense tracts, floated and vegetated upon its surface, constituted vast storehouses, whence the soils have derived many of their richest treasures. Seaweed consists, according to the analysis of Dr. Thompson, of the following elements:

Vegetable albumen,
Saccharine matter,
Mucilage,
Oxalate of lime,
Oxalate of potash,
Malate of potash,
Sulphate of potash,
Sulphate of soda,
Phosphate of lime,
Phosphate of magnesia.
Sulphate of magnesia,
Muriate of soda,
Muriate of potash,
Muriate of magnesia,
Carbonate of potash,
Carbonate of soda,
Hydriodate of potash,
Silica,
Oxide of iron.

With this exhibit, it becomes apparent that the ocean, and not the primitive rocks, has bestowed upon the soil its productive powers. And when we consider the great inequality that exists in divers places, that some soils are extremely fertile and others equally sterile; that some are eminently adapted to the growth of wheat and others to rye; that in one place the oxalis or sour sorrel flourishes, and in another the saline plant, we cannot fail to see that such would be the natural effect of a conversion of the sea into dry land, according to the method recited in the scriptures; that when the continents were upheaved from the ocean, *all* its soils would be thoroughly saturated with sea water, and impregnated more or less with its salts; but, as in our large mill ponds, when the waters are withdrawn, only in

particular portions, in shallow pools and eddies, would the sea-weeds and fishes be detained, there to decay and mingle their own especial elements with the earth. The agriculturist has learned that the ocean is an inexhaustible magazine of stores, from which he may procure the means of invigorating his exhausted lands. Its saline waters are mingled with its calcined shells; its algæ and grasses are carefully gathered and preserved; its fishes and their offal are compressed and transported through great distances; and even the marly tombs of the ancient dead are excavated, to increase the productiveness of his fields. Science may suggest that his coveted treasures are to be found in the everlasting granite mountains, but he has practically learned that they will more surely be obtained from the unstable waters of the deep.

To discuss this generally interesting subject more fully and in detail, would add greatly to its illustration, but its unacceptability with the mass of readers precludes it. We trust, however, that this brief examination of a leaf in nature's book sufficiently reveals, that even the grains of sand upon our earth conjointly attest the universality of the Flood.

CHAPTER V.

"A slender sound, yet hoary time
Doth to the soul exalt it with the chime
Of all his years; a company
Of ages coming, ages gone,
Nations from before them sweeping."

WORDSWORTH.

IN this second part of our work, devoted to the consideration of nature's ways, it may seem odd to find a chapter on human traditions. In a general way they are unreliable, originating in bigotry, ignorance and superstition, and at best can only denote the mental and moral condition of those who entertain them. These, however, are confined to limited regions and ages, and to particular peoples, whilst those to which we refer are world-wide and common with all nations. The traditions of a Universal Flood are as wide-spread as were the diluvial waters—even the distant islands, in the midst of the seas, responding to the persistent voice of the continents. It is unnatural and incredible that all mankind should join in telling a universal lie, for that would be more marvelous than the rational account of the Flood. No local deluge in Greece or Asia would be known to, or remembered by, all the people of the earth, unless identified with their own primitive history. The calamities that befall others are soon forgotten, even if they reach the ears of strangers. Most nations and tribes have been found with some Noah of their own, whose memory, through ages, has lived with them as the father of all mankind. Were not all the families

of men descended from Noah and "scattered abroad upon the face of all the earth from Babel," then these traditions are an inexplicable mystery, even greater than the confusion of tongues and the dispersion of the races. Nothing less than an universal miracle could have engendered, in differently constituted minds, the very same fanciful conception, robed in similar drapery, and at times stamped with the very same names. The sagacious Humboldt compares these ancient traditions, which he found dispersed over the surface of the globe, to the fragments of a vast ship-wreck, which, though but slender sounds themselves, yet sufficiently bespeak their common origin.

The perpetuation of these traditions with all tribes and nations through past time, is not attributable to human design or purpose, for all such structures fail and perish. Their preservation is entirely due to an unswerving law of nature; to an instinct in the human heart that is universal and indelible. Woman, simply as such, exhibits great diversity of character. She may be guileless or full of guile, a tender maiden or a vigorous amazon; she may be urbane, civil and affable, or rude, harsh and ill-tempered; yet, whatever may be her condition or character as a woman, when she becomes a mother a new emotion at once awakens within her breast that is wholly irrepressible. She yields to nature, and, as a slave, obeys its powerful impulses; and the little one, the most helpless of all creatures, by its feeble cry commands her motions, her watchful presence, and her anxious powers. Women may and do differ, but mothers are ever the same, whether in the palace or the wigwam, whether reposing beneath the gilded canopy or the

shadowy foliage of the forest tree; and so, too, are all mothers, as well those that live upon the land as those that inhabit the air and water. It is this maternal tie that has perpetuated the human race and traditions from Noah's day. Children, too, have remained the same throughout all time. When I was a child, I acted as a child, is a text that requires no learned comment for its elucidation, as all feel its force most vividly. Sixteen hundred years ago, boys certainly amused themselves as they do now, according to the writer of the apocryphal "Gospel of the Infancy of Christ," who represents Jesus and other little boys, his companions, as engaged in playing in the dirt and moulding clay into the shapes of beasts, birds and other figures. In the last days, according to the words of prophecy, children will be found playing in the streets of Jerusalem, and then, as now, harnessing the brutes and leading them about. These, as the mind begins to expand, are seized with an ardent thirst for knowledge, and become searchingly inquisitive; and the mother that has anxiously watched the growth of her tender infant, delights to entertain her inquiring, prattling, listening child, with all the wonderful feats of his ancestors, and the marvelous accounts of the olden time. "Take me on your knee, mother, and tell me again about Noah and his Flood," has been the oft-repeated request in every tongue and time. Mothers, as well as children, have descended in an unbroken line from Noah; each, in their respective times, having performed both parts. When children, they acted as children always do—they asked and were delighted; but when older grown, they put away childish things, and did what all mo-

thers do—they answered and entertained. The varied forms presented in these legends disclose that this is the method by which they have been transmitted. In all cases the story seems to be accommodated to the capacities of youth, with its own peculiar surroundings. Only those incidents enter into the description which, in each case, would be familiar or intelligible. Is the ship known, then it is introduced as the medium of rescuing Noah and his family; if not, the boat, or perhaps the raft, is inserted in its stead; and, in regions remote from water, where neither is familiarly known, the top of the mountains is the ark of safety for the chosen few.

This method of perpetuating the memory of the Flood arises from an irresistible law of nature, as operative in controlling the ways of the mother and her child, as that which impels the plant to bloom before it matures its seed, or the hen to gather her brood beneath her wings. It is because it presents a bright page in nature's volume, that we cite it among the natural witnesses, as the well-devised plan of Him whose "truth endureth from generation to generation."

To a particular branch of Shem's descendants were the sacred oracles entrusted. In them, most wonderfully transmitted to us through the convulsive overthrow and confused ruins of empires and nations, are preserved the chronicles of the olden time, even from the beginning. These, in a brief but comprehensive way, furnish an account of the primitive earth, its destruction by the Flood, and the subsequent dispersion of the races, accompanied with such particularity of statement, with reasons, dates, and a precise detail of

successive events, as at once impress it with the stamp of verity. No other version of the Flood contains such necessary indices of the truth; but as they gradually recede from this truly Shemitic centre, they as regularly wane and glimmer in distinctness until they finally vanish in the distance. Only a few of these traditions can we cite, and shall begin with those nearest the centre.

In Assyria, an old legend relates that Xisuthrus, an ancient king of Babylon, was advised by the god Chronos of the intended destruction of the races by a flood that should overwhelm the earth, and that he should prepare for that event by building a large ship into which he should take his family and relations, all the various kinds of animals, and an ample supply of food for their subsistence. Pursuing these directions, he constructed a prodigious vessel, three quarters of a mile in length and half a mile in breadth, and entered into it, with his family and relatives, previously laden with the food and animals. The flood came, as was foretold, and they successfully encountered its violence. When the waters abated, certain birds were turned loose, but they finding neither food nor resting place for their feet, returned to the ship. A few days later they were again sent forth, and after a brief absence returned with muddy feet, and, upon being despatched a third time they permanently remained away. The king thereupon opened the vessel, and discovered that she was resting upon the mountains of Armenia.

Berosus, of whose ancient Chaldean history only a few fragments remain, wrote as follows: "But there was one among the giants that reverenced the gods

and was more wise and prudent than all the rest. His name was Noa; he dwelt in Syria with his three sons, Sem, Japet, Chem, and their wives, the great Tidea, Pandora, Noela, and Noegla. This man, fearing the destruction which he foresaw from the stars would come to pass, began in the seventy-eighth year before the inundation to build a ship covered like an ark. Seventy-eight years from the time he began to build the ship, the ocean of a sudden broke out, and all the inland seas and the rivers and fountains bursting from beneath—attended by the most violent rains from heaven for many days—overflowed all the mountains, so that the whole human race was buried in the waters, except Noa and his family, who were saved by means of the ship, which, being lifted up by the waters, rested at last upon the top of the Gendyæ or mountain, on which it is reported there now remaineth some part, and that men take away the bitumen and make use of it by way of charm, or expiation, to avoid evil."

Still farther to the east, in the Bhagvat Purana, the Hindoo legend recites, that when a demon had stolen away the vedas, which flowed from the lips of Brahma, or in other words when mankind had lost sight of the laws of God, a holy king, named Satyaurata, reigned, a servant of the spirit which moved on the waves, and so devout that water was his only sustenance. As the pious king was making a libation in the river, the preserving power, Heri, under the form of a fish, appeared to him and said, "In seven days from the present time, the three worlds will be plunged in an ocean of death; but in the midst of the destroying waves, a large vessel, sent by

me for thy use, shall stand before thee. Then shalt thou take all medicinal herbs, all the variety of seeds, and, accompanied by seven saints, encircled by pairs of all brute animals, thou shalt enter the spacious ark, and continue in it, secure from the flood, on one immense ocean, without light, except the radiance of thy holy companions. When the ship shall be agitated by a tempestuous wind, thou shalt fasten it with a large sea serpent on my horn, for I will be near thee until a day of Brahma (a year) be completely ended." When, therefore, the sea had deluged the whole earth, augmented by showers from immense clouds, the pious king invoked the assistance of the preserving power, who again appeared on the vast ocean in the form of a fish, blazing like gold, and with a stupendous horn on which he tied the ship, as he had been taught. The horn, in this account, is held to mean a mountain.

Another legend in India holds, that it was upon the Himalaya mountains that the giants were slain and the demons destroyed who fought against the gods when the world was covered with waters.

The Chinese assert, that immediately preceding the appearance of Fohi upon the mountains, an immense flood occurred which covered all the earth, and then subsided, thereby dividing the former from the later races of mankind.

The Siamese relate, that the sea-girt earth was once overwhelmed with water to the depth of nine miles.

The Kamschatdales not only have a tradition of a universal flood, but to this day point to the spot on the summit of a lofty mountain. where Kutka, their

supreme deity, stepped out of a boat, and again repeopled the earth with human beings.

In the midst of the North Pacific the people of the Sandwich Islands rehearse, that once there was nothing but sea, and that an immense bird settled on the water and laid an egg, which soon burst, and produced the island of Hawaii; and that their progenitors were a man and a woman, who, in a canoe, were saved from a flood, and came to the island with a hog, a dog, and a pair of fowls. These are their only domestic animals.

In the midst of the South Pacific, in Otaheite, the inhabitants affirm, that upon a former occasion the Deity becoming enraged, dragged the earth through the sea, but by accident their island was broken off and thus happily preserved.

Turning again to the Shemitic centre, we find these human traditions growing more and more faint as we trace them westwardly; premising that those of Egypt closely correspond with those of Assyria and India, as deduced from their mythology.

With the Greeks, the first descendants of Japhet, who possessed themselves of the isles of the Gentiles, the traditions of the flood are well preserved upon ancient coins or medals, ascribed to the times of Pertinax and the elder Philip. There are two of them, and in both are perceived the ark floating upon the water, the patriarch Noah and his wife, the dove on the wing, the olive branch, the raven perched upon the top of the ark, with the familiar name of Noe inscribed upon the side. An after scene impressed upon these medals represents Noah and his wife in the attitude of rendering thanks for their safety after

their debarkation. The genuineness of these medals, says Dr. Kitto, has been placed beyond all question.

The flood known as that of Deucalion is well described by Lucian, and so closely resembles that of scriptural Noah, that no room is left for doubt. The ancient people, on account of their violence, injustice, blasphemy and inhospitality, provoked the wrath of heaven and were devoted to destruction. For the accomplishment of this purpose, heavy rains occurred, accompanied with mighty eruptions of water from the bowels of the earth, by which the rivers were swollen, and the ocean so raised as to cover all the earth. Deucalion, however, with his sons and their wives, entered into a great ark which he had built; and therein also followed him, by pairs, all manner of animals that lived upon the earth, and from them he received no hurt whatever. Thus were he and they all rescued from the general destruction; and by them were all the races renewed. To this account, Plutarch, Lucian's contemporary, adds, "that Deucalion, towards the close of his voyage, sent out a dove, which coming back in a short time, indicated that the waters still covered the earth. Being again sent out, it failed to return, or as some say, returned to him with mud-stained feet, intimating the abatement of the flood."

Ovid, with all the freedom of a poet, more graphically relates the scene of destruction. He describes the Great Jupiter as terribly provoked with the wickedness of men, and determined to destroy the race:

"With soaking wings, the south wind flies abroad, having his terrible face covered with pitchy

darkness. His beard is loaded with showers, the water streams down his hoary locks, clouds drip with wet, and as with his broad hand he squeezes the hanging clouds, a crash arises, and thence showers are poured in torrents from the sky. Iris (the rainbow), the messenger of Juno, clothed in various colors, collects the waters and bears a supply upwards to the clouds. The standing corn is beaten down, the expectations of the husbandman, now lamented by him are ruined, and the labors of a long year prematurely perish. Nor is the wrath of Jove satisfied with his own heaven; but Neptune (God of the sea), his azure brother, aids him with his auxiliary waves. He calls together the rivers, to which, soon as they had entered the abode of their ruler, he says, 'I must not now employ a lengthened exhortation. Pour forth all your might, so the occasion requires. Open your abodes, and, each obstacle removed give full rein to your streams.' Thus he commanded. They return, and open the mouths of their fountains and roll on into the ocean with unobstructed course. He himself struck the earth with his trident; on which it shook, and with a tremor laid open the sources of its waters. The streams breaking out, rush through the open plains, and bear away, together with the standing corn, the groves, flocks, men, houses and temples, together with their sacred utensils. If any house remained standing, able to resist ruin so vast, yet the waves rising aloft, covered the roof of that house, and the towers tottered, overwhelmed beneath the stream. And now, sea and land had no mark of distinction. Everything was now ocean, and to that ocean shores were wanting. One man takes possession of a hill, another sits in a covered boat and plies the oars, where he had lately ploughed; another sails over the standing corn, or the roof of his country house beneath the water; another catches a fish on the top of an elm tree. An anchor (if chance so directs) is fastened in a green meadow, or the curved keels come in contact with the vineyards now below them; and where of late the slender

goats had cropped the grass, there unsightly sea-calves are now reposing their bodies. The Nereids wonder at the groves, the cities and the houses under the water; the dolphins get into the woods, run against the lofty branches and become entangled with the tossing oaks. The wolf swims among the sheep, the wave carries along the tawny lions and bears away the tigers. Neither does the power of his lightning shock avail the wild boar; nor his swift legs the stag. The wandering bird too, having long sought for land whereupon to rest, its wings failing, tumbles into the sea. The boundless range of the sea had overwhelmed the hills, and the stranger waves had beat against the height of the mountains. The greatest part is carried off by the water; those whom the water spares, long fastings overcome through scantiness of food.

"Phocis separates the Aonian from the Actæan region—a fruitful land while it was a land; but at that time it had become a part of the sea and a wide plain of sudden waters. There a lofty mountain rises towards the stars, with two tops, named Parnassus, advancing beyond the clouds with its summits. When here Deucalion, (for the sea had covered all other places), borne in a little ship with the partner of his couch, first rested; they adored the Corycian nymphs, and the deities of the mountain and the prophetic Themis. No man was there more upright than he, nor a greater lover of justice; nor was any woman more regardful of the deities than she."

Still westward, in Northern Europe, the Scandinavian Edda preserves in figurative language a tradition of the deluge:

"On the death of the great giant Ymir, whose flesh and bones form the rocks and soils of the earth, and who was slain by the early gods, his blood, which now constitutes the ocean, rushed so copiously out of his wounds that all the old race of lesser giants, his offspring, were drowned in the flood which it occa-

sioned, save one. He, by escaping on board his bark with his wife, outlived the deluge."

Crossing the ocean to America, we find in every part of the continents, north and south, that the Noachian Flood was effectually embalmed in the memories of these isolated people. That in the central portions, more civilized, and evidently derived at an early day from the Phenician descendants of Sidon and Tyre, the Mexicans and Peruvians, in their legends maintain a stronger resemblance to the Mosaic version of the Flood than the other American aborigines. Humboldt, in his researches, was guardedly cautious in gathering up the various traditions which he met with in America, and thus writes of those existing in the central portion:

"Of the different nations who inhabit Mexico, paintings, representing the deluge of Coxcœ, are found among the Aztecks, the Miztecks, the Zapotecks, the Tlascaltecks, and the Mechoachans. The Noah, Xisuthrus or Menow of these nations, is called Coxcox, Teocipactli, or Tezpi. He saved himself and his wife Xochiquetzal in a bark, or, according to other traditions on a raft of Ahuahuete (the Cypress disticha;) but according to the Mechoacans, he embarked in a spacious Acalli, with his wife, his children, several animals, and grain, the preservation of which was of importance to mankind. When the Great Spirit, Tezcatlipoca, ordered the waters to withdraw, Tezpi sent out from his ship a vulture, the Zopilote. This bird, which feeds on dead fish, did not return, on account of the great number of carcasses with which the earth, recently dried up, was strewed. Tezpi sent out other birds, one of which, the humming bird, alone returned, holding in its beak a branch covered with leaves. Tezpi, seeing that fresh verdure began to clothe the soil, quitted his bark near the mountain of Colhuacan."

In another portion of the same country the tradition extends over a greater space of scriptural history, and states, that before the great inundation, which took place 4800 years after the creation of the world, the country of Anahuac was inhabited by giants; and that all those who did not perish were transformed into fishes, except seven, who fled into caverns. When the waters subsided, one of the giants, Xelhua, surnamed the architect, went to Cholollan, where as a memorial of the Tlaloe, which had served as an asylum to himself and his brethren, he built an artificial hill in form of a pyramid. The gods beheld with wrath this edifice, the top of which was to reach the clouds, and, irritated at the daring attempt of Xelhua, they hurled fire on the pyramid; numbers of the workmen perished; the work was discontinued, and the monument was afterwards dedicated to Quelzalcoatl, the god of the air.

In Guatimala, the tradition proceeds, that the Teochiapans, who came from the north, were led by a chief whose name was Votan, the grandson of the illustrious old man, who at the time of the great deluge, together with his family, was saved on a raft. He coöperated in the construction of the great edifice, which by men had been undertaken to reach the skies; but the execution of this rash project was frustrated, and each family received from that time a different language.

Upon the Orinoco, as elsewhere in South America, Humboldt learned from the natives "that at the time of the great waters, when their fathers were obliged to betake themselves to their canoes to escape the general inundation, the waves of the sea beat upon

the rocks of Eucaramada; and when asking the Tamanacs how the human race survived the great deluge, was answered, 'That a man and a woman saved themselves upon a high mountain, Tamanacu, situated on the river Aseveru, and that, throwing behind them, over their heads, the fruits of the Mauritia palm, they saw arising from the nuts of these fruits, the men and women who repeopled the earth.'"

Even the most barbarous of the Peruvian Indians, when first known, referred to the time, before the age of the Incas, when all mankind were destroyed by a flood, save six only who escaped upon a raft; and the Indians of Terra Firma believe that when the great deluge took place, a single man, with his wife and children, escaped in a canoe.

In the northern hemisphere, similar accounts existed amongst the various tribes of Indians when they were first known to Europeans. In Franklin's journey to the Polar Ocean, is preserved the traditions of the Dogrib Indians. One in relation to the fall of man, by his disobedience in eating a forbidden fruit; and another, of Chapewee, who embarked with his family in a canoe, and took with him all manner of birds and beasts to escape an inundation; for the strait on which he lived being choked up by fish, which he had caught in a weir, the waters rose and overflowed the earth and covered it for many days. But at length he said, we cannot always live thus, we must find land again, and he sent a beaver to search for it. The beaver was drowned and his carcass was seen floating on the water. He then despatched a musk-rat upon the same errand, who was long ab-

sent, but returned at last, almost dead with fatigue, holding a little earth in his paws. For a long time, Chapewee's descendants were united as one family; but at length some young men, being accidentally killed in a game, a quarrel ensued, and a general dispersion of mankind took place.

Dr. Richardson, who accompanied Franklin in his Arctic journey, says that "the Crees all spoke of an Universal Deluge, caused by an attempt of the fish to drown Wœsachootchacht, a kind of demigod, with whom they had quarreled. Having constructed a raft, he embarked with his family and all kinds of birds and beasts. After the flood had continued some time, he ordered several water fowl to dive to the bottom. They were all drowned, but a musk-rat having been despatched upon the same errand was more sucessful, and returned with a mouthful of mud."

The Choctaw Indians used to assemble their young men and women from time to time, that the elders might rehearse to them the stories which they had received from their ancestors. Lanman, in his adventures in the wilds of America, presents their account of the Flood in the simple but figurative style, common with the sons of the forest. To the memory of the departed Choctaws, we insert their tradition amongst the other monuments of the Flood:

"The world was in its prime, and time had rolled on with its accustomed regularity. The tiny streams among the hills and mountains shouted with joy, and the broad rivers wound their wonted course along the peaceful valleys. Many a tall oak had grown from the acorn, spread its rich foliage to the summer

winds, decayed with age, and mingled with its mother. The moon and stars had long made the night-skies beautiful, and guided the Indian hunter through the wilderness. The sun, which the red man calls the glory of the summer time, had never failed to appear at his appointed periods. Many generations had lived and passed away.

"In process of time the aspect of the world became changed, brother quarreled with brother, and cruel wars covered the earth with blood. The Great Spirit saw all these things and was displeased. A terrible wind swept over the wilderness, and the red men knew that they had done wrong, but they lived on as if they did not care. Finally, a stranger prophet made his appearance among them, and proclaimed in every village that the human race was to be destroyed. None believed his words, and the moons of summer again came and disappeared. It was now the autumn of the year. Many cloudy days had occurred, and then a total darkness came upon the earth, and the sun seemed to have departed forever. It was very dark and very cold. Men laid themselves to sleep, but they were troubled with unhappy dreams. They arose when they thought it was time for the day to dawn, but only to see the sky covered with a darkness deeper than the heaviest cloud. The moon and stars had all disappeared, and there was constantly a dismal bellowing of thunder in the upper air. Men now believed that the sun would never return, and there was great consternation throughout the land. The great men of the Choctaw nation spoke despondingly to their fellows, and sung their death songs, but they were faintly heard in the gloom of the great night. Men visited each other by torch light, the grains and fruits of the land became mouldy, and the wild animals of the forest became tame, and gathered around the watchfires of the Indians, entering even the villages.

"A louder peal of thunder than was ever before heard, now echoed through the firmament, and a light was seen in the north. It was not the light of the

sun, but the gleam of distant waters. They made a mighty roar, and, in billows like the mountains, they rolled over the earth. They swallowed up the entire human race in their career, and destroyed everything which had made the earth beautiful. Only one human being was saved, and that was the mysterious prophet who had foretold the wonderful calamity. He had built a raft of sassafras logs, and upon this did he float safely above the deep waters. A large blackbird came and flew in circles above his head; he called upon it for aid, but it shrieked aloud, flew away, and returned to him no more. A smaller bird, of a bluish color, with scarlet eye and beak, now came hovering over the prophet's head. He spoke to it, and asked if there was a spot of dry land in any part of the waste of waters? It fluttered its wings, uttered a sweet moan, and flew directly towards that part of the sky, where the newly appearing sun was just sinking in the waves. A strong wind now arose and the raft of the prophet was rapidly borne in the same direction which the bird had pursued. The moon and stars again made their appearance, and the prophet landed upon a green island, where he encamped. Here he enjoyed a long and refreshing sleep; and when morning dawned he found that the island was covered with every variety of animals, except the great *shakanli*, or mammoth, which had been destroyed. Birds, too, he also found here, in great abundance. He recognized the identical black one which had abandoned him to his fate upon the waters; and as it was a wicked bird, and had sharp claws, he called it *Fulluh-chitto*, or bird of the Evil One. He also discovered, and with great joy, the bluish bird, which had caused the wind to blow him upon the island, and because of its kindness to him, and its beauty, he called it *Puch-che-yon-sho-ba*, or the Soft-voiced Pigeon. The waters finally passed, and in process of time that bird became a woman, and the wife of the prophet, from whom the people now living upon the earth are all descended.

And so endeth the account of 'The Overflowing Waters.'"

Such is the character of the many ancient legends found diffused over the globe, relative to the great physical convulsion which, in Noah's day, overwhelmed the whole earth, and barely spared the races. An incident of such interesting magnitude could not fail to prove a constant theme of discourse with those who had so miraculously escaped the general havoc, and indelibly impress itself upon their posterity. The ark and mountain, as associated with their deliverance and preservation, would naturally acquire a degree of veneration which, even the legends disclose, they certainly enjoyed, in former times. Messrs. Faber, Harcourt and others, who have deeply investigated the subject, demonstrate that the incidents of that remarkable era are thoroughly interwoven into the names and languages, into the political and religious systems, of most of the ancient people; that the pyramids and towers, the cairns, cromlechs and mounds, are really arkite structures, and the superstitious usages connected with them are but the deformities that usually spring from over-fervid imaginations. But a moment's consideration teaches us, that all this is truly natural, and has been historically the same in every age. It was the common practice with the Jews, even from the earliest period, to commemorate events with piles of stones; and the Greeks and Romans, with more elaborate statues, columns and arches. We, in our day, endeavor to illustrate remarkable events, and perpetuate the memory of great men, and even of our departed relatives, by the erection of monuments, obelisks and

pillars, by costly paintings and descriptive medallions; they of the olden time, to preserve alive in memory man's deliverance from the overflowing waters, reared their tablets and lesser cairns to typify the ark; their mounds of earth and greater pyramids of stone to symbolize the mountain. These still remain, as the attesting memorials of the Flood.

The ethnologist assiduously labors to ascertain the relationship between different nations. A favorite method with him is to scrutinize their respective languages, and if he finds two or more of them using similar words to express the same idea, he unhesitatingly concludes that one has proceeded from the other, or both have descended from the same original source. Words are but the adopted symbols of ideas, the vocal representatives of internal thought and feeling; and if an accordance or similitude between the mere shadowy symbols be sufficient to establish an affinity between distinct nations, how much more satisfactory and conclusive, as to the community of origin, should be the proof, when all nations and tribes of people are found agreeing, not in the mere shadows and representatives, but in the actual and substantial primary ideas and thoughts themselves? And when this congruity exists not in single and separate words and sounds, but in a clustered group of associated ideas, presenting, as in a grand panorama, the varied features of a gigantic scene, such as human fancy could not have universally conceived, the proof becomes irresistible, that all nations and people must have had a common origin, and that their line is gone throughout all the earth, and their words to the end

of the world;" "that the testimony of the Lord is sure, making wise the simple."*

* A chapter on "*Comparative Philology*" would not be out of place, though it would prove interesting to but few. The delving researches of the learned, however, tend powerfully to establish that all the varied languages of the earth have radiated from the great Noachian centre. An able writer on "The Study of Sanskrit," in a recent number of the *Southern Review* (Jan. 1869), briefly recites the conclusion upon this subject as follows:

"Till the beginning of this century some general resemblances had been perceived, and it was the opinion of many, that Latin was the daughter of one of the Greek dialects. But it amounted to a revelation, when it was shown that not only Latin and Greek, and German and English, but also Danish and Icelandic, Russian and Polish, Irish, Scotch and Welsh, stood in such relation to one another as made it impossible to consider them otherwise than as sisters—daughters of a common mother. This is proved by a large induction of facts, comparisons of declensions, conjugations, pronouns, prepositions and verbal roots. It is accordingly supposed, that at a remote period, *the primitive race dwelt in Asia, probably on the table lands near the northwest corner of India, and spoke the mother language.* From this point colonies went forth, some into India and Persia, some westward to Europe, and different dates have been fixed for these migrations, and therefore different degrees of antiquity for the various languages."

CHAPTER VI.

UNIVERSAL DISPERSION.

Sweep! mighty ocean, sweep!
Ye winds blow foul or fair;
Our God is with us on the deep!
Our home is everywhere!—REV. S. GRAHAM.

IN the preceding chapters, we have examined the volume of nature, and found everywhere most legibly written, the grand fact that there has been a Universal Deluge, such as is described in scripture. True, we have only read the pages descriptive of that event in a hurried and general way; but if the voluminous record were more minutely discussed, the particulars eliminated would add overwhelmingly to the proofs. Such an investigation, however, would be relished only by a few, as it would necessarily be shrouded in scientific and technical terms, that are repulsive to the great mass of readers. Unfortunately, in every age the learned Magi and Savans have used a species of hieroglyph, differing from the symbols employed by the common people. This is so in our day, and it is to be regretted; as it necessarily locks up within restricted limits the useful and curious learning which man has acquired. In passing on to other matters, only a general consideration of the fossils can be indulged.

As the earth, upon the subsidence of the Flood, must have been entirely destitute of vegetation, some

may conceive that Noah, with the hosts of animals entrusted to his charge, was situated like,

> Peter Piper, who had a cow,
> But had no hay to give her,

Such a conclusion would naturally suggest itself to many, and especially to those surrounded with all the comforts and conveniences of life from early infancy. A little reflection, however, is only requisite to dispel any such delusion. Noah and his sons were not shipwrecked, but landed as sagacious emigrants from their ancient well provided homes. They had been long apprised, before their departure, of the character and destitution of the country they were to land upon, and had made ample provision for so great a change. As all emigrants do, so did they, in the most efficient manner. We find them in their tents, planting vineyards, and becoming husbandmen immediately, indicating previous preparation. Armenia, the country in which they settled, has ever been remarkable for fertility, and only three months, including both seed time and harvest, are necessary for the most abundant crops. How infinitely preferable was the situation of Noah and his family, to that of the first settlers of America. They had no red men, nor wild beasts, nor forests to encounter; no stumps nor roots in their fields to obstruct immediate culture; but with an abundant store in the ark for the present use of man and beast, they could make short drafts upon nature to supply their own future wants. For themselves and their posterity, therefore, there was no difficulty in securing abundant supplies; but how were the animals to be maintained? The antediluvian stores will not last

always, and there must be some resource for their future. The answer to this question is not such as some have supposed, that plants were created in pairs in some Mesopotamian spot, and thence slowly distributed over the rest of the earth. No such hint is found in the scripture record.

When the Lord told Noah to prepare for the Flood, he instructed him to gather the animals together, and a sufficiency of food to save *their seed* upon the earth, but gave him no direction as to saving the seed of the vegetable world. That duty was not devolved upon Noah, but the Lord reserved that matter to himself, and employed other agencies for the purpose. He knew, that in His Almighty way He could sow and plant the whole world, with all kinds of seeds, sooner than Noah and his sons could sow a ten acre field; and he did not entrust so great a matter to such feeble hands. How He did it, the vegetable world discloses, and to understand the method, we have only to recur to the beginning of the Flood and mark the occurrences of that eventful period.

For forty days were torrents of rain falling upon the earth, softening, scoring and furrowing the soil, tearing up the growth of the fields and undermining the magnificent forests. The great fountains of the deep, too, were hurling their destructive billows over the extended plain, to excavate the soil, and prepare the vegetable world for an early transportation. No sooner have they discharged their offices, than the surface of the ancient world subsides beneath the waters, and then as a mighty tidal wave, the ocean rushes in to lift and bear away to an amphibious world, the freight thus prepared for its coming. The

broad equatorial current, a vast river in the ocean, 3500 miles in width, pursues its regular rounds from east to west, and sweeps upon it and before it the monarch of the forest as well as the humblest tenant of the field. Oaks and cypress, beech and walnut, palm and pine, are now bound in death together by the luxuriant vines, that in life hung so gracefully from their branches. The Flora of the ancient world, as if conscious of neglect by Noah, becomes an ark of safety for its own seed, and hastens to transfer it to other soils. In this expeditious, admirable and gigantic manner was the vegetable world preserved and distributed over the existing continents. The waters of the ocean, within a centre belt of fifty degrees, travel from east to west, and outside of this middle river others flow in opposite courses; but in the days of the flood an uprising world, with its mountains, plateaus and plains, successively appearing, modified their directions, and turned them here in one way, and there in another; now in direct lines, and again in deflected curves; and in particular stages and places, even produced whirling regurgitations upon a grand and continental scale. By a recurrence to the forms of the continents, their shapes and general elevations, the position, direction, and heights of their mountain chains, plateaus and plains, and the order in which these different parts of the earth must have successively appeared above the ocean's surface, the reader may easily discern the course of the currents, in their progressive series, and readily solve the interesting problem as to the various diluvial drifts, with the antique souvenirs by them deposited. For instance, we have already learned, that the great

current that bore the ark to Ararat, after the end of the 150 days, was stayed by the emergence of the Zagros chain, directly in its front. This was only a local stoppage, for elsewhere the waters continued to flow, as urged by the laws of nature. Westward of the Zagros occur the plains of Arabia, and over these deeply sunken regions, and in the direction of the Red Sea mountains, the equatorial current, turned aside by the Lupata chain of Africa, would take its course, and overspread the continent of Europe, then 6000 feet at least below the level of the sea, and cover its original marine surface with the vegetable, animal and earthy mementos of the primitive world. So, too, the Americas should exhibit the relics of the olden time, especially the portion north of the equator, as South America stands to the height of 1151 feet, and North America only 748, above the ocean. When the mountains on its western margin dammed back the flowing waters, its pampas and prairies were yet greatly submerged, even to the depth of 10,000 feet or more; and the gulf stream, that is now turned back by the isthmus, and compelled to seek an outlet from the gulf by the Bahamas, then laved the bases of the mountains, but gradually receded to its present position, as the uprising plains slowly emerged from the deep. Sands, shells and clays should here be abundantly found, covering the buried mementos of the Flood. Read by this light, what marvellous and astounding revelations has not the present earth to make! The "treasure caves and cells" of the primitive ocean are more replete with riches than all the crypts and niches of the present deep. Valuable repositories do they prove to en-

lighten the mind of man, and confirm the Christian's faith.

When the Adamland and all its glories perished, what became of the ancient dead? The reader will at once respond, that with the vegetable world, the beast, the bird and reptile, were transported from their former homes, and finally rested upon the bed of the former ocean, now the abode of man; and here, as they should be, are they in prodigious numbers found. Just as it would be now, were one of the existing continents submerged, so did it really and in fact occur in Noah's day. The ocean's surface was literally covered with the numberless forms of organic life, which were drifted far away on every side, to find sepulture in the chambers of the deep. As the waters generally bury their dead, the diluvial currents bore along the soil the clays and sands of the ancient land, and heaped it in deep layers over their sunken bodies. So have they remained until our day, most carefully interred, and so well preserved as unerringly to testify that their present cemeteries are exceedingly distant from their former habitations. The forms of all the fossils attest, with one united voice, that they have been transported from a world greatly differing from the present; and that they really lived and flourished in a heated and tropical climate, and not in the cold and uncongenial regions where now they are found entombed. So manifest are these evidences, that the geologist and palæontologist, entirely ignoring the Flood, accept, as a sure conclusion, that these ancient beings resided where their relics are interred; and that fact once assumed as certain, as a necessary corollary from such premises, they have

deduced, according to the syllogistic method of old Mrs. Frost, that the whole earth then, from pole to pole, was invested with a truly tropical atmosphere; here again invoking the aid of another stupendous miracle to explain a mystery evolved by their own researches. So familiar has the geologist become with the tenants of these ancient tombs, that in imagination he conceives how they "lived and move, and had their being," in actual life, and presents us with many vivid landscape views painted in glowing colors.

A few short extracts from their books will place the matter fully and plainly before the reader's mind. Mons. Figuier, in his late and interesting work, "The World before the Deluge," thus graphically depicts the primitive scene, as fancy has presented it to his view:

"Alongside the birch, the walnut, the oak, the elm, and the alder, rise lofty palm-trees, of species now extinct, with many evergreen trees, as the firs, the pines, the yews, the cypresses, the junipers and the tree of life. The luxuriant vines ascended the trunks of great trees, and hung in festoons of ærial garlands from their branches. The ferns were there represented, and the mosses formed an humble but elegant and lively vegetation, alongside the terrestrial and frequently ligneous plants above noted. The water caltrop, with fine rosettes of green and dentated leaves, floats gracefully in ornamental ponds, and the water chestnut and pond weed afford a shelter for the fishes. 'The lower tertiary,' says Lecoq, as he describes the vegetation of the period, 'constantly reminds us of the tropical landscape of the present epoch, in localities where water and heat together impress on vegetation a power and majesty unknown in our climates. It is, moreover, a pecu-

liarity of this period, that the whole of Europe comprehended a great number of those plants which are now confined to Australia, and which give so strange an aspect to that country, which seems in its vegetation, as in its animals, to have preserved in its warm latitudes the last vestiges of the organic creations peculiar to the primitive world.'" (Page 278.)

This description applies equally as well to America as to Europe, and, for the sake of brevity, we forbear to quote duplicates of the same scene.

From the location of the different fossils, it is apparent that the chief current that flowed over the old hemisphere took its general course towards the pole through France and England, and on this route found hollows and depressed basins in the ocean's bed, in which they deposited, as in eddies, the different matters they bore. As proof of the fact, it is manifest that the heavier woods, as walnut, beech and oak, would not be transported so far as the palms, ferns, coniferous pines, and other lighter woods of the tropics. Many we may know, becoming water-soaked, would sink, but even then, down the steep declivities they would be driven forward, and, by attrition, be deprived of their roots and limbs. In comparing the Eocene flora found in the respective neighborhoods of London and Paris, Sir Charles Lyell writes:

"The fossil species of the island of Sheppey indicate a much more tropical climate than the Eocene flora of France, which has been principally derived from the 'gypseous series.' The latter resembles the vegetation of the borders of the Mediterranean, rather than that of the equatorial region. Mr. Bowerbank, in a valuable publication on the fossil fruits and seeds of the island of Sheppey, near London, has described no less than thirteen fruits of palms of the

recent type Nipa, now only found in the Molucca and Philippine islands. These plants are allied to the cocoanut tribe on one side, and on the other to the screw pine. Species of cocoanuts are also met with, and other kinds of palms; also three species of custard apple; cucurbitaceous fruits (the gourd and melon family) are in considerable abundance. Fruits of various species of acacia are in profusion, and although less decidedly tropical imply a warm climate. The contiguity of land may be inferred not only from these vegetable productions, but also from the teeth and bones of crocodiles and turtles, since these creatures must have resorted to some shore to lay their eggs. A snake which must have been thirteen feet long, and a true crocodile, and another saurian more nearly allied to the gavial, accompany the above fossils. A bird allied to the vultures, and a quadruped allied to the hyrax, hog and chæropotamus, has been added to the palæontology of this division." (Elements, p. 200.)

As an account of the myriads of animals, with their positions upon the several continents, and their modes of burial, would occupy one or more volumes, we can only briefly refer to them in our little manual, with a few quotations, premising, as a common scene during the Flood, that many would naturally be found upon the floating timber.

Says Mons. Figuier: "Mammals, birds, reptiles, fishes, insects and mollusca, form the terrestrial fauna of the Eocene period. In the waters of the lakes, whose surfaces are deeply plowed by the passage of large pelicans, lived molluscs of varied forms. Turtles swam about; snipes made their retreat among the reeds which grew upon the shore; seagulls skimmed the surface of the waters, or ran upon the sands; owls hid themselves in the cavernous trunks of old

trees; gigantic buzzards hovered in the air, watching for their prey; while heavy crocodiles dragged their unwieldy bodies through the high marsh grasses. All these terrestrial animals have been discovered in England, or in France, *alongside the overthrown trunks of palm trees.* The temperature of these countries was then much higher than it is now. The mammals which lived under the latitudes of Paris and London are only found now in the warmest countries of the globe." (World before the Deluge, 280.)

As to all this ploughing, swimming, running and dragging, the reader will at once perceive its inappropriateness, as we are examining the charnel houses of antiquity, far removed from the cities and sites of the living. The depth at which these ancient remains are buried is oftentimes very great, and their covering consists of alternating layers of sands, clay and impacted shells of different kinds, sometimes so impregnated with sulphur, derived by the currents from some submarine volcanoes in the line of its course in the Grecian Archipelago, in Italy or Sicily, or perhaps in or near the Paris basin itself, as to have formed immense beds of gypsum. To account for the presence of these fossils, the geologist is forced to assume that even England enjoyed at some former time a tropical climate, with palms and cocoa nuts growing in London, and oranges ripening near the frigid zone; and that it was really more tropical in temperature on the Thames than in Paris. As live turtles and crocodiles lay eggs, and palm trees grow on dry land, we must from these fossils, even now deposited far below the ocean's level, infer, that formerly there existed in that region, a continent

with suitable shores, although we are not informed as to where it was, what has become of it, nor from what source was derived the vast quantity of clay, sand and shells that now lies heaped upon these ancient remains. All these and many other difficulties are well and sufficiently explained by the washing away of the primitive world, and a distribution of its parts over the bed of the ancient ocean, then uprising, to present a mysterious problem for future geological solution. The excessive heat of this Eocene period is really more inexplicable than the other features of this fanciful hypothesis; and to explain it, the learned astronomer has been consulted as to a change in the position of the poles of the earth; but this department can give no support to such conjectures, as the heavens affirm that they now appear as of old. Hence this age of the earth's high fever remains as fanciful as that of the succeeding glacier chill, with the unnatural inconsistency in their relations, that the cold stage followed the hot.

One of the strongest and most incontestable evidences of the deluge, is the very extensive distribution of the remains of those huge animals that lived in the antediluvian world, and especially that class that were covered with thick skins, and are known as Pachyderms. Some may doubt whether these creatures would bear transportation to any great distance; but when it is remembered, that even now it is not an uncommon occurrence for *thin skinned* pulse, beans, peas and other kindred plants to be transported across the Atlantic, from Africa to America, and there to germinate; and others again to be transferred from the West Indies to Norway, Scot-

land and the coasts of Europe, in a perfectly sound and healthy state, by the Gulf stream, it will readily be conceded, that the *thick skinned* races, dying in vigorous and hale condition, might well be swept by saline waters through distances equally as great, and even much greater.* Those with thin skins, and unprotected by a heavy coating of hair or wool, would not be drifted so far, but would sooner putrefy and fall to pieces; and this would be particularly the case with the human body, with its slight protection, and it is never known to be borne to any great distance in the water. Such animals as the mastodon and mammoth, the elephant, rhinoceros, hippopotamus, the horse and others, were wafted to all the northern portions of the globe, and buried in such places and latitudes, as render it morally certain that their homes were very distant from their graves. The more nearly to the arctic regions do we ascend, the more densely do we find the earth imbedded with their relics.

In Northern and Eastern Asia, in the frozen plains of Siberia, the streams as they wash away the soil

* On the 5th of January, 1699, a terrible volcanic eruption occurred on Mount Salek, in the island of Java, accompanied with 208 shocks of an earthquake. Next morning the Batavian river, which rises in that mountain, became very high and muddy, and brought down an abundance of bushes and trees, half burnt. The channel of the river being stopped up, the water overflowed the country round the gardens about the town, and some of the streets, so that fishes lay dead in them. All the fish in the river, except the carps, were killed by the mud and turbid water. A great number of drowned buffaloes, rhinoceroses, deer, apes and other wild beasts were brought down by the current, and, observes one of the writers, "notwithstanding that a crocodile is amphibious, several of them were found dead among the rest." C. Lyell, Princ., 484.

are continually bringing to view the bones and skeletons of mammoth and mastodon, rhinoceros, bears, horses, large stags, deer, &c.; and so prodigiously numerous are these remains, and so promiscuously are they commingled, as to forcibly suggest the idea, that in the last days of the Adamland, terrified, and in great herds, they hurried rapidly northward to escape from the pursuing flood, but were at length overtaken and consigned to a common grave, beneath the adjoining deep. These frozen regions, even at this day, are said to furnish larger quantities of ivory than the torrid zone itself. Two islands in the Arctic sea, beyond the northern verge of the continent. Lachou and New Siberia, consist entirely of mammoths' remains and sand, mingled and frozen together —and the "*island of bones*" has for 500 years furnished to extensive caravans, immense quantities of ivory, annually released from the heterogeneous mass, by the thawings of the short summers. With most of these animals, putrefaction had commenced before their burial, but some were embalmed in the ices in so sound a state, and have been so well preserved, that when recently extricated their flesh was entirely free from corruption.

As we proceed westward from Asia, these fossils everywhere abound, but more abundantly in the north. In Scandinavia, in Ireland, England, Germany, France, Spain, Italy, Greece, and Russia, they are entombed upon the Eocene bed, and covered with the later sands and clays that constitute the plains. Across the ocean in North America, the remains of extinct fossils, the mastodon and mammoth, the elephant, the horse, and other animals, have at different

points been exhumed, and their positions and surrounding circumstances sufficiently indicate that they reached their present sites from some foreign land, by the currents of the ocean. Throughout the southern coast country, their remains are generally found immediately upon the bed of the ancient ocean, surrounded by Eocene shells, as if their bodies had fallen to pieces, and their dismembered limbs been scattered and dispersed by the waves. Over them lie the immense and continuous beds of sand and soil, sometimes fifty feet or more in depth, that constitute the lowland plains of these States; and these sands and earths are in such even and uniform layers, one above another of different colors, yellow, brown, gray, drab, mottled and snow white, with an occasional layer of fine and tenacious clay, as can leave no room to doubt, that they were deposited by the ocean itself. From the geographical features of the country, it is evident that when these relics were so deeply buried, no habitable land could possibly have existed nearer to them than from 75 to 100 miles. Hence they must have had their homes elsewhere. Those remains in the northern States and higher latitudes are all found in the alluvial drift, as it is termed, but are not buried so deeply. It is very seldom that entire skeletons are found; yet two have been disinterred, bearing with them the insignia of foreign lands. In Pennsylvania one was exhumed, containing in his stomach food only *partially digested*, which upon examination proved to be a species of rush or flag, that does not grow farther north than Virginia; another, in the northern part of New Jersey, contained partially digested twigs of the white

cypress, or juniper, as it is often designated in the south, the extreme northern limit of which is found in a small swamp on the southern boundary line of Delaware, 175 miles, at least, in a direct line from the grave of this ancient mammal. As there is no reason whatever, to believe that these Virginia rushes or flags, and this species of cedar, have ever grown in any higher latitude than they do at present, it is absolutely impossible, and, therefore, incredible, that these animals should have eaten their last meals in Virginia, in the one case, and on the southern border of Delaware, in the other, and then traveled 175 or 200 miles without fully completing their digestion; and at the end of these long journeys been suddenly killed, and as quickly buried, and that so immediately, deeply and perfectly, as not only to preserve their bodies entire, but even the food they had eaten in such distant regions. Reason dictates that these creatures must have gathered their last repast in their former haunts in Adamland, and been drowned soon after, before digestion was finished; and in this state were hurried to their destination by the currents of the ocean, and hastily buried with the detritus transported with their bodies.

The geologist, judging from the slow progress in terrestrial changes made by the agencies now visibly at work, has formed his systems, and divided the chronology of the earth into many successive periods, each consisting of "countless ages." The latest, or "tertiary," which is held to have immediately preceded the coming of man, is again subdivided into three minor stages. First, "The Eocene," or dawn of the modern and existing state of things, was undoubt-

edly the ocean's bed at the time of the Flood. It is upon this strata that are found the first indications of mammal and terrestrial life, and hence it is compared to the twilight dawn, that is followed by the distinct lustre of mid-day. Second, the "Miocene," exhibiting a sudden and perfect change in formation as well as fossils, consists of those sands and clays that constitute the great plains of the continents: as in America, the broad basin of the Mississippi Valley from the Rocky Mountains to the Alleghanies; and the southern and middle lowland coasts of the Gulf and the Atlantic, as also all the plains of Europe, Africa and Asia. Third, the "Pliocene," exclusively furnishing only modern fossils, or the shells and remains of races that now live upon the continents and adjoining coasts, is held to have sufficiently prepared the earth for man's creation and reception; and that he was accordingly made and placed upon it at this period, as before this era human footprints can nowhere be discovered.

As the remains of these ancient animals are in such prodigious numbers, throughout the broadest zones, and in the most diverse latitudes, found resting, either directly upon the ocean's Eocene bed, or in the midst of the diluvial Miocene sands, and clays, and shells, next above it, which have evidently been transported and evenly spread by the action of flowing water—the conclusion is irresistible, that to one and the same agency must be ascribed the transfer of both the floating bodies and the earths which cover them. Their position towards the Adamland, relatively considered, is in perfect accordance with the direction taken by the ark, and the natural course of the

ocean's currents, as we have before deduced them from the varying reliefs of the continents. By referring to a common map or globe, the reader will at once conceive how the great equatorial river of the Pacific, when checked and diverted by the Lupata chain of Africa and the Red Sea range of Arabia, would directly bear the fauna and flora of the ancient world over the face of Europe to Great Britain, making heavy deposits as it passed over the Grecian Isles, Italy, France and Germany, precisely as they are now found to be. England, the richest of all the fossil mines, is the terminus of upheaval in that direction, and is the true converging point of the diluvial waters, as it stands upon the globe opposite to the middle of the Pacific, and equidistant from the eastern and western shores of the Adamland, where the opposing streams would meet. In America, the ancient flora has been deposited by the receding Gulf Stream, before referred to, in many deep ravines and basins, ranging generally in a northeastwardly direction, as if the course of the waters had been controlled by the uprising mountain chains. Alaska, with her coal fields, significantly affirms, that as in the Atlantic the Gulf Stream is continually engaged in transporting tropical timber to Iceland and Greenland; and in the Pacific a similar coast current is discharging a like duty for the Aleutian Islands; so, too, even in Adam's day, a primitive Gulf Stream along the eastern coast of the continent was charitably employed in providing stores of fuel for the present generation, and perhaps to nerve the iron horse to force his way to the open polar sea.

Besides the pachyderms, referred to as so plen-

teously distributed over the earth, most of the existing races have some ancient representative in the fossil tombs. Many, however, occupy such equivocal positions, that it is by no means easy to decide whether they should be assigned to ante or post-diluvian ages. Many of them have undoubtedly lived since the Flood, and in the course of their migrations from a common centre, been overtaken by casualties, floods, landslides, earthquakes, and the noxious exhalations preceding and accompanying them, which must have been of more frequent occurrence soon after the Flood than at present. Upon the mountains of Himalaya, the monster Sivatherium has been found—one of the deer family, about the size of a modern elephant, with four horns of great size. Others of this family have been discovered in the peat bogs of Ireland, with their heads and horns thrown backwards and resting on their backs, as if in life they had mired down and died; the great megatherium, and others of South America, the ancient representatives of the modern tapirs and sloths, may be considered amongst the doubtful. In some cases it is possible, and even highly probable, that the fossils of the two worlds have since the Flood been intermingled, and thus furnish uncertain testimony as to their character; and particularly so do the contents of the caves appear which have been found containing bones, in England, Germany, Southern Europe and South America. The Kirkdale Cave, in England, which may be taken as a fair type of the class, is thus described:

"It extends, as an irregular narrow passage, two hundred and fifty feet into the hill, expanding here

and there into small chambers, but hardly enough anywhere to allow of a man's standing upright. The sides and floor were found covered with a deposit of stalagmite, beneath which there was a bed of from two to three feet thick of *sandy, micaceous loam*, the lower part of which, in particular, contained an innumerable quantity of bones, with which the floor was strewn. The animals to which they belonged were the hyena, bear, tiger, lion, elephant, rhinoceros, hippopotamus, horse, ox, three species of deer, water-rat and mouse.

"The most plentiful were hyenas, of which the bones found would suggest their number at several hundred, and their size as one half larger than any living species.

"The bears belonged to the cavernous species, which, according to Cuvier, was of the size of a large horse.

"The elephants were such as are known by the name of the Siberian mammoth.

"The largest of the stags equaled the modern moose in size.

"These remains were deposited antecedent to the "*diluvium*," because the bones are covered by a bed of this formation.

"Finally, raised from the waters, but with no direct communication with the open air, it remained undisturbed for a long series of ages, during which the clay flooring received a new calcareous covering from the droppings of the roof."*

In 1833, the Rev. Mr. McEnery collected from the caves of Torquay, human bones and flint knives, amongst a great variety of extinct genera; all from under a crust of stalagmite, *reposing* upon which was the head of a wolf.

Caves have been opened near Plymouth, in the Plymouth Hoe, and at Yealm Bridge, in all which

* Types of Mankind.

human bones were found, mixed with fossil animal remains.

M. de Cristolles found in tertiary limestone, at Pondres, in the department of the Hierault, human bones and pottery, mixed with the remains of the rhinoceros, bear, hyena, and many other animals. They were imbedded in mud and fragments of the limestone rock of the neighborhood, the accumulation in some places being thirteen feet thick.

Dr. Schmerling has examined a large number of localities in France and Liege, where bones of man occurred, together with those of animals of extinct species, all found, in all respects, under the same conditions as to age and position. Near these relics were also works of art disclosed; such as fragments of ancient urns and vases of clay, teeth of dogs and foxes pierced with holes, and doubtless worn as amulets.

The caves of Gailenreuth, in Franconia, of Zahnloch and Kuhloch, are all elevated more than three hundred feet above the levels of the rivers, and that of Copfingen at least 2,500 feet above the sea; yet they all contained human and animal remains, and that of Kuhloch the vestiges of at least 2,500 cavern bears. These and other cases are more definitely described by Col. H. Smith, in his work on "The Natural History of the Human Species," in the "Types of Mankind," and by Sir Charles Lyell, in his "Principles," to which the reader is referred.

These caves are found in limestone countries, and the stalagmite that covers the floors and the remains, have been formed by drippings from the roof, holding lime in solution, since any stream, which once

might have done so formerly has ceased to run through them.

Before the upheaval of these countries, there were no cavernous hollows existing. The limestone being composed of the calcareous bodies of marine insects drifted together and then cemented into a solid mass, must have rested upon a stratum of some kind before cementation. They must have been formed, too, whilst the ocean covered the spot. Previous to their deposition, the dismembered remains of the rhinoceros, hippopotamus, mastodon and others, may have been as elsewhere accumulated, or spread over the bed of the sea, and covered with a deposit of loose micaceous sands; and upon this again was finally drifted, a heavy layer of the microscopic shells of the madrepores. The last were consolidated into limestone, and the whole upheaved above the sea, sometimes to very great heights. The upraising would be attended with ruptures in the stone forming the roof, and water flowing through these fissures would naturally remove the loose supporting sands. Caves thus formed would, in after ages, become the resort, the hiding places, or "strongholds," of men, aswell as the haunts of beasts, and some memento of such tenants might well be found in them. Saul and David, with his men of war, with their "artillery," their javelins, spears and arrows, were in the Cave of En-gedi at the same time; and many caves in the same region, as elsewhere, are even now occupied by fugitives and robbers. Postdiluvian pottery, arrow-heads, hatchets, a wolf's head, or human bones, might thus be well found in such places, and even be confusedly intermingled with the ancient fossils by inflowing

streams or occasional freshets. The primitive bed itself might be torn up, and the stalagmite deposit of one age be dissolved and borne away, to be replaced by another when the stream should leave the cave, and take some other channel. In all limestone countries such changes are by no means infrequent; large rivers, as well as the smaller branches, having been known, in modern instances, to sink and disappear beneath the surface, only occasionally revealing themselves at distant points. To discuss the merits of the equivocal cases is beyond our limits, and unnecessary for our purpose, which is simply to point the way to truth. The number of the plain and unambiguous witnesses is so great, as well of the vegetable as of the animal kingdom of the shells, the sands and the clays, that their detailed examination may be dispensed with in our general review. Mons. Figuier, who is perfectly familiar with the scene, seems transported, and thus poetically writes:

"It is probable that from one pole to the other—from the equator to the two extremities of the axis of the globe—the earth must have formed a vast prairie without limits, while an immense carpet of verdure covered its whole surface; and such abundant pastures would be necessary to sustain these prodigious numbers of herbivorous animals of great size. The mind can scarcely realize the immense and verdant plains of the primitive world, animated by the presence of an infinity of such inhabitants. In its burning temperature pachyderms of monstrous forms, but of peaceful habits, traversed the tall vegetation, composed of grasses of all sorts. Deer of gigantic size, their heads ornamented with enormous horns, escorted the heavy herds of the mammoth; while the horse, small in size and compact in form, galloped and frisked round these magnificent horizons

of verdure, which no human eye had yet contemplated."

Thus writes the imaginative geologist, enraptured with the contemplation of the wreck and ruins of an ancient world. How much greater would have been his ecstasy could he have really seen the ancient Adamland itself, with giant men and giant beasts, surrounded with giant forests, fields, and verdant prairies, glorying in its pristine vigor? He would not have wondered at the ubiquitous dispersion of the ancient tenants of the torrid zone, had he known the tropical regions alone of the Adamland were nearly as great in superficial extent as all the modern continents combined; and he would have been greatly surprised at the paucity of the ancient tropical flora that was sunken, buried and preserved, as that derived from nearly forty millions of square miles now occupies less than 325,000.

Leaving these eloquent and lucid witnesses, that by the Flood were thus scattered abroad upon the face of all the earth, we turn next to cast a glance at the dispersed races of the deep, who, with marvelous and most remarkable distinctness, confirm their testimony, and even fix with precision the date of this universal discomfiture.

All fish do not live in the same place, nor in the same kind of water. There are climates in the ocean as well as upon the land; the deep hollows of the one corresponding to the elevations on the other. As we ascend a mountain the air becomes colder, more rarefied, and less suitable for comfortable existence; so too the water, as it increases in depth, becomes denser, contains less air, and unsuitable

even for the cold nature of many of the finny species.

Some of the tenants of the ocean—shell-fish as well as those clothed with scales and fins—like deep water, some middling water, and some prefer the surface. Warm water is more agreeable to one class, whilst others prefer it temperate or even icy cold. The broad ocean, with unbounded freedom, is the delight of many, whilst shallow continental shores and restricted seas and gulfs are the blissful haunts of others.

When the ancient Adamland was converted into ocean, and the ancient ocean became the dry land now existing, there was a total subversion in the relations of former things, and the homes of all were reversed. It therefore became necessary for the testacea, and mollusca, and the other residents of the seas, to seek new homes, suitable to their respective natures. Those that delighted in the shallow waters of the primitive coasts and inland seas, suddenly found themselves submerged in the precipitous depths of the Pacific; and those that formerly had enjoyed the liberties of mid-ocean, were as suddenly subjected to the thraldom of the continents. The latter, in disgust, would naturally leave these uncongenial quarters, and seek their comfort in broader zoological provinces, whilst the former would as readily come in and fill their places. Such an exchange suddenly took place, as the fossil beds of the former sea most perspicuously declare.

The remains of shell fish upon the continents are found in beds, arranged one above another, each exhibiting characters peculiar to itself, and readily dis-

tinguishable from the others. The Eocene beds—the dawn of modern existences, foreshadowing the coming of man upon the stage, as the geologist affirms, upon which repose the later Miocene sands, shells and clays, and their inhumed witnesses—are composed of the ancient and effete forms of shell fish, which abruptly end, and are no longer found alive in the surrounding waters. Their descendants are only known to exist at distant points in the broad ocean; and as man, and beast, and plant, came in and took possession of these continents, so, too, did their companions, the modern shell fish of the coast, migrate to the neighboring seas, and from Noah's day make their homes upon the primeval Eocene graves. Sir Charles Lyell thus distinctly describes this change:

"The tertiary strata are all of them characterized by fossil shells, of which a considerable proportion are specifically identical with the living mollusca; and the greater the number, the more nearly does the entire fauna approach in species and genera to that now inhabiting the adjoining seas. But in the Eocene formations (next below this tertiary) the proportion of recent species is very small, and sometimes scarcely appreciable, and those agreeing with the fossil testacea often belong to remote parts of the globe, and to various zoological provinces." *

In this emphatic manner, when opened and examined, do the unpretending catacombs of the humblest rabble of the seas unfold historic scenes of weightier moment than the ornate tombs of Egyptian monarchs.

Nature's broad volume on every page discloses, that a mighty revolution has once occurred in her or-

* Manual, 174.

ganic structure, whereby all primitive things became reversed; that the first happy world has departed, and the tenants of the deep now disport themselves, amidst the shrines of the ancient dead; whilst the later sons of man roam with ecstacy and delight over the ossuaries of the former main; that sharks now nestle in the lairs of the lion, and bears now hide in the Nereid's cave; that the nimble sea-gull dips the green wave with his pinion, where once the tuneful linnet cheered its young with a song; and that the great eagle now takes his prey from the land, where once the bold albatross skimmed the blue waters with his broad wing. All have changed places, the world is transformed, the revolution complete; and so say the conjoint voices of the land and the sea, the present living and the ancient dead.

The page of nature, thus read by Divine light, is truly wonderful, yet plain, simple and rational; and whilst perfectly consistent with all we do know, it reveals to us an Almighty Power, whose ways are not as our ways, nor whose thoughts are as ours. The learned geologist feels assured that he has read aright the hieroglyphic characters inscribed upon this ancient volume, but his interpretation will not bear the scrutiny of common reason, nor stand the tests adopted as the touch-stones of genuine truth. Whenever man departs from the straight and direct path of verity, he soon becomes entangled in the mazes of the absurd regions. So palpable is this the fact, that the mathematician has accepted it as an infallible test of error in his precise and exact science. When his solutions end in absurdity, or rest upon it, he is assured, and at once admits, that his assump-

tions have been false, and he rejects them and begins anew. The "reductio ad absurdum" is not confined to the mathematics alone, but is equally valued in all departments of learning where logical rules prevail and rational conclusions are desired. The geologist, however, claims exemption from the obligations of this sound and universal law, and insists that his grand contemplations are not to be restricted by the bounds of common human reason; that to him the right belongs, when discussing nature's ways, to assert that she has behaved most *un*naturally; and that his is the liberty to soar into those absurd regions, where a Munchausen may scarcely venture, and to which the poet's eye "in fine phrenzy rolling," dare not cast a glance. Presuming upon such high prerogatives, he demands our credence to his extravagant conjectures, that for countless ages, from pole to pole, the whole earth blossomed as a rose, with tropical forests abounding in the iceberg nurseries, and the gigantic beasts of the Torrid Zone in great herds enjoying the luscious fruits; that this glorious summer was suddenly made into a protracted winter, reaching to the equator, that involved all living things in one sad and final fate; that the glaciers came, and with them universal death; but as they in their peregrinations failed to crush the bodies of their victims into invisible atoms, and were alike unable to bury their dead, to secure their sepulture, and preserve their fossil forms, that thousands of majestic rivers flowed in every direction, transporting sands, clays, shells and gypsum from imaginary and inconceivable sources, and that, too, in myriads

of places, where not even the slightest vestiges of the rivulet remain to attest their former existence.

He would further tax our credulity with his carboniferous theories, in which, while he admits that the coarse conglomerate pebbles, and lighter sands, the clays that compose the shales, the tiny shells of the limestone series, and the sulphur that is frequently mingled in these alternating beds, have all been transported into depressed basins by the currents of the seas, yet that the tropical woods, of which the seams of coal consist, the most buoyant and easily transferable of all the congregated elements, originally grew upon the very sites where their remains are found. This he boldly asserts, although these ligneous strata lie in many instances 1000 feet and more below the level of the ocean, are extremely bare of roots—which were evidently worn away in the grinding process of transportation—and repose upon beds of such pure and well washed materials, sometimes of black band iron ore, almost impenetrable to tools of steel, as render it incredible that any decent tropical plants would or could have grown upon such beds, and in such positions. Other physical wonders are invoked to account for this incredible state of things. For instance, old England, it is insisted, must have been upheaved more than 1000 feet above her present altitude, and so upheld, whilst tropical seeds found their way to these uncongenial beds, in saddle shaped troughs, to the great neglect of the richer adjoining soils. There they flourished and grew for ages, and when sufficiently matured to form a seam of coal, the island, aware of its duties, sank beneath the waves, and the kind

waters rushed in, prostrated their magnificent forms, and buried them with a deep layer of impoverished earth for a future growth of plants. This done, Old England again arose from the deep; more tropical seeds sought these same depressions, and grew and flourished, only to be subjected, by a second sinking of the island, to a similar process of prostration and burial. Again and again did subsidences and upheavals occur, until the troughs were filled, and thirty seams of coal separately placed one above the other indicate, according to the theory, that as a tallow chandler makes dip candles, so has proud England received her many dips, to secure for her sons their present heat and light. This may appear incredible, but it is not more so than that the granite superstructure of the island so gallantly endured the sixty different flexures to which it must have been subjected. She cannot rest upon the ordinary crust of the earth. Such repeated and violent torsions would have sundered even a base of iron or steel, dropped the island into the fiery lake below, and admitted such a maelstrom of briny waters as might have extinguished the internal fires. If English and all other coal fields have been formed in this way, for consistency's sake we should believe that the solid base of the earth is not composed of brittle rock, but really consists of the toughest kind of India rubber.

From this brief view, it is manifest that these geological theories will not bear the touchstone test of the reductio ad absurdum, and whilst compelled to dissent from their interpretation of the great book of nature, we do so with regret. To the learned and intelligent gentlemen who compose this school, all should

acknowledge their profoundest obligations. It is to their untiring zeal and labors that we are indebted for a knowledge of the hieroglyphic characters inscribed upon the stony page, and to their enlightened researches for a revelation of even the existence of such leaves in the comprehensive book. Yet it is to be regretted that their fervent self-confidence ever incited them to the task of deciphering these ancient inscriptions, without a reliable Rosetta Stone to elucidate their meaning. The Mosaic expositor well unravels every mystery, and in its written words and syllables, finds corresponding symbols in the impressed tablets of the olden time. With it to guide, we avoid the absurd regions, and dispense with all miraculous interpositions of summer heats to make, and the chilling blasts of protracted winter to unmake, the primeval forms of ancient things; neither do we require countless ages for the slow accomplishment of physical changes, for in the simplest, plainest and most natural manner, do both the volumes affirm, that, when the hand of the Lord is engaged, one day with him is but as a thousand years with man.

After thus viewing the dispersion of the ancient dead, the reader will conceive more vividly the happy, grand and comprehensive method by which the seeds of the vegetable world were saved and scattered abroad upon the face of all the earth. Sixty-five millions of square miles, one third of the area of the whole earth, has been washed up, and the plants that grew thereon, covering the face of the great ocean, are in all directions borne away by the diverse cur-

rents of the air and the sea. Will the reader pause, and in imagination consider the awful sublimity of this scene, exhibiting truly the wreck of matter and the crush of worlds, and then seriously ask and answer, whither did the several members of this uprooted host finally betake themselves to rest? But comparatively few were thoroughly embalmed in the fossil depositories of the deep; the rest, the unnumbered multitude, failing to obtain a sufficient burial for their preservation, returned again to dust. The seeds of many were no doubt interred so deeply beneath the soils, as effectually to prevent their germination and decay; and these, even now, when brought to the surface, at times develop themselves and occasion surprise and wonder in the new and unknown forms which they present. The seeds of others sank and perished before they reached the land; and of those that escaped the dangers of the seas, and rested upon propitious soils, many were so exhausted as to be powerless for reproduction. Notwithstanding the many obstacles, a sufficiency, borne aloft by the sturdy arms of perishing parents, or enwrapped by the preservative mucilage and salts of the sea, surmounted all difficulties, found congenial homes and started the vegetable world anew. Plants are so prolific, especially in open fields, far away from foes, that but a few are requisite soon to populate a continent. "It is scarcely a century," says Linnæus, "since the Canadian erigeron, or flea-bane, was brought from America to the botanical garden at Paris, and already the seeds have been carried by the winds, so that it is diffused over France, the British Islands, Italy, Sicily, Holland and Germany." Several others

are mentioned by the Swedish naturalist as having been dispersed by similar means. "The common thorn-apple," (Jamestown weed), observes Willdenow, "now grows as a noxious weed throughout all Europe, with the exception of Sweden, Lapland and Russia. It came from the East Indies and Abyssinia to us, and was thus universally spread by certain quacks, who used its seeds as an emetic. The same plant is now abundant throughout the greater part of the United States, along roadsides and about farmyards."*

All sound seeds will sink in fresh water, if artificially cleaned, or otherwise deprived of their natural appendages; yet they are all provided in their natural state with buoys that enable them to swim for periods longer or shorter. The cocoanut is enclosed in a large ship-shaped husk, that enables it to cross the ocean, and it is known to be an early visitor to all the newly erected coral islands. Walnuts, hickory nuts, and the seeds of that class, are not only enveloped in hard and horny shells, but these again are surrounded with buoyant coats, covered with watertight skins. The acorns, in hermetical envelopes, are provided with cups firmly attached to portions of woody stem, that enable them to float. The seeds of the pine and poplar are quite small, and are closely compressed within the leaves of light cones, that both protect and support them upon the water. Many seeds, as apples, oranges, peaches, plums, etc., are surrounded with pulpy matter nicely wrapped in a leathery tunic, and are thus enabled to conduct their extended voyages in safety. Others are provided

* Lyell's Principles, p. 604.

with waterproof pods, filled with air, which secures for them both lightness and security. The stalk and stems, the chaff and woody and herbaceous matter attached to the seeds of nearly all plants, are eminently adapted to secure their successful migration by water. Yet all are not equally equipped for making voyages of the same length, and some are much more delicate and perishable than others. As in the animal, so in the vegetable kingdom, the pachydermatous or thick-skinned races would be naturally susceptible of the widest diffusion. The cereals, as well as the plum, the cherry and kindred fruits, with thin skin and spare and delicate pulp, would perish much earlier than the beech, the acorn, or the walnut. Most of this class were only preserved upon the nearest coasts of the Adamland. The coffee-bean, with its thin skin and remarkably small pulp, narrowly escaped utter extinction, as the ardent lovers of that beverage may tremble to learn, for only a few of the seed seem to have landed on the proximate shores of eastern Africa, from whence, in later days, they have been transported to Arabia and America.

Botanical geography, even in its undigested state, furnishes a proof of the Deluge, in the continental distribution of the plants. Asia and Africa, situated in the front of the broad equatorial river, exhibit on their faces strong memorials of that event in the undue proportion and character of plants that were severally received and preserved by them. Asia furnishes nearly every kind of plant that is found upon the globe, and many that exist nowhere else; and it is a remarkable fact that those most valuable and useful to man, seem to have accompanied the ark, and to

have rested upon Caucasus, Taurus, Libanus, Armenia and the regions surrounding Ararat. Persia, Arabia, Syria, Palestine and the Mediterranean shores, in the variety of their peculiar and useful plants, indicate perfectly the course of the equatorial river, as the continents emerged from the deep, and then received the seeds that eventually germinated and flourished. This view of the subject is well confirmed by the late "Sketch," (of Dr. F. Unger, of Germany,) "of the plants chiefly used as food by man," in which after referring to the original distribution of plants of the whole earth, he says:

"It will, however, be seen that the distribution of nutritious plants is by no means uniform, but that on the contrary certain parts of the earth are particularly favored, while in others they occur but sparsely, and in many regions are almost entirely wanting. *This must have influenced very much the distribution of the human race over the earth*, and its increase and accumulation in particular regions.

"If we investigate this condition of things still farther, by marking down upon a map of the earth the different nutrimentitious plants, in their original localities, or in the ideal central point of their distribution, and represent the different varieties by particular symbols, we will obtain a very intelligible idea of the primitive condition of things, from which many important conclusions may be deduced. The following table elucidates that the eastern hemisphere received and contains three times as many nutritious plants as the western.

"It is a remarkable fact that nutritious plants are accumulated together *in a linear direction*, as well upon the eastern as upon the western hemisphere. If we draw a line from the Moluccas to Ireland, by far the largest number and most important nutritious plants are seen to have originated along or in the di-

rection of this line. Into this line fall the nutritious plants of the eastern archipelago of hither and farther India, of Nepal, Persia, Armenia, the Crimea, Greece, Italy and Central Europe.* The regions exterior to this belt of land furnish only a few species, and these mostly of little value, such as China, Japan, Central Asia, and the eastern and western coast lands of Africa. The coast of north Africa falls in part into this linear belt *ranging from southeast to northwest.*

"New Holland, New Guinea, &c., take their place as the most inhospitable portions of the earth.

"The same law of distribution, although less prominently exhibited, exists in the Western hemisphere. A similar line runs from Brazil, by way of Guyana, Peru, Ecuador, Central America, the West Indies, and Mexico, along which are accumulated by far the most important and influential nutritious plants. The species peculiar to North America, &c., are only of inconsiderable moment."

"In Armenia, walnut and apple trees abound, the latter, in the cold district of Akhlat, fruit weighing nearly a pound. Mesopotamia encroaches upon Armenia, and furnished the forests which supplied Alexander and Trajan with the timber for building their fleets. Wheat, barley, rice and the cereals abound, as also do cotton and wool, tobacco and silk. The peach and the apricot, the fig, lemon, pomegranates and cherries, even liquorice, are here, with tamarinds, the cypress and weeping willows. The date furnishes food to man, the leaves a covering for their houses, and their trunks for timber. The Euphrates is adorned with a variety of flowers, such as lilac and jessamine, whilst the luxuriant vine and generous olive abound, with other various fruit

* The course thus prescribed by Dr. Unger for the distribution of nutritious plants, is precisely the same with that taken by the fossil fauna and flora, when the currents were forced over the plains of Arabia and Continental Europe, by the upheaval of the Lupata chain and the Red Sea mountains; and the island of Sheppy furnishes fossils resembling the plants of the Moluccas.

trees. Persia seems to have lost the forests, with which all its mountains were formerly covered. There are still in the valley of Shiraz, delightful walks shadowed by oriental planes, medlar trees, weeping willows and poplars of extraordinary size. In the midst of these fine trees, many plants, remarkable for beauty and for fragrance, are lavished by the hand of nature, such as blue and scarlet anemones, jessamines, hypericums, tulips, ranunculi, and a paradise of roses. Olivier gathered in that country several plants formerly unknown to the botanist. He found one plant, then new, of the umbellate order, smelling like thyme. Those plants that affect a saline soil are found on the elevated plains of Central Persia. Towards the Caspian, the atmosphere, warm and moist, permits the sugar cane to grow. Travelers, forcing their way by climbing through thickets of sweet-briars and honey-suckles on the sides of the hills, find themselves surrounded with acacias, oaks, lindens and chesnut trees. Above they see the summits crowned with cedars, cypresses, and pines of various descriptions. The sumach abounds, and the flowering or manna-ash is equally common. In Ghilan, the boxwood is so abundant that camels cannot be employed, as the leaves of this tree are poisonous to that animal. The most common grain is wheat, the quality of which is excellent; but rice, oats, barley, millet, and rye are also used. Persia is famed for her fruits. There are twenty sorts of melons, and they are sometimes exceedingly large. The most esteemed fruits in Europe are believed to have been brought from Persia, as the fig, pomegranate, the mulberry, the almond, the peach and the apricot. The oranges are of enormous size, and the lemon equally fine. The vine here displays all its riches, but it is only cultivated by the Guebres, or worshipers of fire. There are, among other varieties, three particularly excellent. That of Shiraz is kept for the use of the sovereign and the grandees of the court. Among the vegetable tribes that are useful in the arts, may be named linen, hemp, tobacco,

sesamum, which gives an oil, cotton, saffron, various gums and gall nuts. The olive grows wild in all moist situations, and its oil, with opium, manna and rhubarb, are among its exports.

"In Syria and Palestine, the sesamum, with its oil and doura similar to that of Egypt, abounds. Indigo grows without culture on the banks of the Jordan, and requires only a little culture to acquire a good quality. The hills of Latakié produce tobacco. As for trees, the olive of Provence grows at Antioch and Ramli to the height of the oak. The white mulberry forms the riches of the country of the Druses, by the beautiful silks obtained from it; and the vine, raised on poles or creeping along the ground, furnishes red and white wines equal to those of Bordeaux. Jaffa boasts her lemons and watermelons; Gama possesses both the dates of Mecca and the pomegranates of Algiers. Tripoli has oranges equal to those of Malta; Bairout has figs like Marseilles and bananas like St. Domingo. Aleppo is unequalled for pistachio nuts, and Damascus possesses all the fruits of Europe; apples, plums, and peaches grow with equal facility on her rocky soil.

"In the extensive arid deserts of Arabia, the mountainous oases are shaded with date trees and other palms. The sandy plains produce the same plants as northern Africa. They are chiefly of the saline and succulent kind, such as mesembry-anthemum, aloe, euphorbium, stapelia and salsola. They serve to alleviate the thirst of the camel, and present exhilarating objects to the traveler in the painful journeys of the caravans. Many of the plants of Persia and India, celebrated for their beauty or their usefulness, have been always indigenous, also, in this country. Such are the tamarind, the cotton shrub, the banana, or Indian fig, the sugar cane, a species of nutmeg, the betel, and all sorts of melons and pumpkins. The balm of Mecca, the produce of the balm tree, is the most fragrant, and sells at the highest price of all the gum-resins. The coffee that grows upon the mountains of Yemen, considered the finest in the world,

the Arabs say was first imported from Abyssinia. Arabia Felix has ever been famed for her incense known as olibanum. There are some groves or thickets on the mountains of Arabia, but no forests, properly so called, are found. Amongst the great variety of her trees, we shall only name the fig, orange, plantain or banana, the almond apricot, the acacia vera, from which gum Arabic is obtained, the sensitive plant, and others of the mimosa family. The fruit of the quince tree and the vine is enjoyed in perfection. Among the shrubs and the plants the castor oil bean and senna, both employed in medicine, are worthy of mention: also the globe amaranth, the white lily, and the large pancratium, all of distinguished fragrance; the aloe, the styrax, and the sesamum, which supplies the place of the olive."

If the original vegetable features of Asia and Europe have been modified, as we may suppose them to have been, by the migrations of man and other natural and ordinary causes, yet in Africa we should expect to find a fair specimen of her first lineaments, as she has given much and received but little from the other continents. Standing directly in front of the great equatorial river, she received a vast variety from the Adamland—very many of them wholly peculiar to herself; and some, such as the heavy bulbous roots, which could not have been transported to any great distance. In these last Africa abounds, not in limited patches, but in broadly extended areas.

"In Abyssinia the forests are magnificent, and in some places odoriferous. The tamarind, the date, the coffee tree, the sycamore fig and the banana abound. The gardens contain many species of fruit trees and of leguminous and oily plants which are unknown to us. In the valley of the Zaire and neighborhood, Professor Smith found 22 genera and 500

species of plants absolutely new, and not found elsewhere. Nature, here all life and activity, presents to the eye a luxuriance which no description can excel. The downs are enameled with flowers of every hue. The fields and woods are decked with lilies whiter than snow; in every direction, there are entire groves of tulip of the most lively colors, intermixed with the tuberose and hyacinth. Near the southern Cape, the naturalist finds more wonders to admire in this than any other country; it is from hence we have received the most magnificent plants that adorn our green-houses and gardens; many others, however, not less beautiful, continue strangers to European use. The class of bulbous plants may be considered as one of the most characteristic of the flowers of the Cape, since nowhere else are they to be found so numerous, so various, and so beautiful. The botanist may here admire the numberless varieties of Ixia, their brilliant colors, their exquisite scent; he will find it difficult to count the superb species of the iris, the morell, the corn-flag, the amaryllis, the hœmanthus, the pancratium, which, after the autumnal rains are to be seen covering the fields and the foot of the mountains. During the other seasons, the gnaphalium, the xeranthemum with their red, blue or silky white flowers; the sweet smelling geranium, and a thousand other plants and heaths, vary this scene. Even in the midst of stony deserts, are seen fleshy plants, the stapelia, the mesembryanthemum, euphorbia, crassula, the cotyledon and aloe. Some attain the height of trees, which, together with the weeping willow or the different species of mimosa, shade the banks of torrents, produced or enlarged by the rains. The silver-leaved protæa imparts to the groves of the Cape a metallic splendor, while one of the numerous species of heath gives the appearance of a carpet of hair. The Cape olive tree and the sophora, a tree like the ash, are remarkable, whilst magnificent oaks exist in the east of False Bay.

"In the eastern portion of the continent may be mentioned a species of millet, highly pleasant, both

in taste and smell, the ears of which are a foot long and weigh three pounds. The luno forms a very white and pleasant bread, as good as that made of wheat; the ears, of triangular shape and the grains of the size of mustard, are of an iron-gray color, marked with a black spot. Buckwheat affords two crops, rice is abundant but not esteemed; the cassava, pistachio nut, the yam, and a species of bread-fruit grow well. The incouba (whence goubber), or pea of Angola, grows underground. Liquorice abounds as a parasitical plant. Tobacco, indigo and cotton are indigenous, and grow without labor, and sugar cane flourishes in the marshy places. Many species of plants, resembling those of the West Indies, as the orange, lemon, pineapple, banana, fig, pimento, and pepper, with great variety of the palms, forests of mangroves, sandal wood, red and gray, tamarinds, and cedars, with the gigantic Baobab, are found in the botanical provinces of Africa." *

A systematic and scientific investigation of the plants of the earth, made with especial reference to the ocean's currents, would unfold many wonderful truths, of which we now have but little or no conception. Maize, Irish and sweet potatoes, are generally acknowledged to have originally existed only in America. These have been traced to the western slopes of the Andes, as most probably their primitive homes. After careful inquiry, the learned Humboldt fixed upon the western side of the mountain chain in Chili, as the first nursery of the Irish potatoe; a position, over which, if not prevented by the continent, would flow to-day a well known ocean current from the southwest, which in a portion of its course is honored with Humboldt's name. From these facts combined, we may infer that this and its associated

* Malte Brun.

plants probably grew in the southern part of the Adamland, not far distant from their modern habitations, and when exiled, were received and rescued by the uprising mountains as they emerged from the deep.

The original disposition of plants, and especially those of a nutritive character, has, however, since the flood undergone great alterations. Continent has exchanged with continent, and region with region, through the many agencies that have been employed in that service; and it is a singular fact that these creatures of the vegetable kingdom, each moored to a single spot, can in their generations accomplish more in the way of migration, than those animate kingdoms endowed with locomotion. And as it would be impossible for the young to enjoy existence amidst the roots and under the shadows of their parents, their very helplessness invites the sympathy, and secures the aid of all other moving powers. As the great ocean, so do the streams and rivers of the land, transport to great distances the seeds that fall or roll, or are blown into them. Thus, plants from the heads of great rivers may find their way by generations throughout the entire lengths of continents, and ultimately reach the most distant points of the globe, abiding for a season on some hospitable island in the midst of the sea.

The winds, too, cheerfully aid the helpless plants, and find many of them awaiting their approach, being provided with wings or sails, which adapts them for ærial voyages to the most distant points. Out of a great number, may be cited as instances the pines, firs and sycamores, which often astonish mankind by

their sudden appearance in new regions. One class of plants, called cryptogamic, with innumerable seeds as fine as dust, are found, as might be expected, most widely distributed. Mr. Fries, of Sweden, estimated that a single mushroom produced ten millions of these seeds, and it is not therefore at all wonderful that they should exhibit their striking character of ubiquity. Mosses, lichens, and fungi are found around the polar circles, upon the snowy summits of mountains, upon the plains, on the housetops and fences, upon the trunks of trees, in cellars, mines and caverns; the light and numerous seeds being wafted by the winds that travel to and from the poles, and encircle the earth in their continual rounds. "Chief among the lichens is the *manna stalk*, growing north of Caucasus in the greatest profusion, loosely attached to the dead, loamy soil and unfrequented rocky cliffs of the Tartarian and Kirgese steppes of Tartary. From this source have come, by the aid of high winds, those remarkable showers of *manna rain* that have been known to fall profusely at the greatest distances, and even to cover broad areas in Persia and Asia Minor, not only in former but in recent times. This lichen manna is of the size of the hazel nut, and when ground into flour, and baked as bread, affords ample sustenance for man."*

Animals in many ways contribute to the diffusion of plants, and it really seems as if the duty were sacredly enjoined upon them all, to disperse as far as they can, the seeds of those that they especially feed upon. Our domestic animals spread abroad the seeds of the grain and grasses which constitute their

* Dr. Unger.

food; and so, in like manner, do the wild beasts of the forest. The opossum is remarkable for his distribution of the persimmon, or American date plum, of which he is very fond; and the little squirrel, in the autumn, is often seen bearing in his mouth, from the tops of tall oaks, the ripe acorn, which he takes off to the distance of many yards, and deliberately buries. He thinks, no doubt, that oaks may die, but the generation of squirrels will abide forever. The birds are employed throughout the year in helping the feeble plants, and providing stores for their own posterity. Whether in the field, the forest, or the garden, the berries engage their attention, and of these, after the pulpy portion is enjoyed, the undigested seed are consigned to the ground. Grapes, cherries, blackberries, raspberries, the holly and the cedar, with thousands of others, are thus happily dispersed. The seeds of many plants are also furnished with burrs and prickles; and no moving object can approach within reach of the parent plant, but she, by their aid, attaches to them many tokens of her regard, to be transported to new homes. Man himself, as well by accident as design, has proved a powerful agent in the distribution of plants, not only the useful and beautiful, but even the execrable and pestiferous. All the cereals, fruits and vines, and many of the ornamental species, have been thus designedly removed through the greatest distances; whilst unintentionally, his ships and caravans, in their bales and packages of goods, have transferred secreted seeds to new and distant regions. Invading armies, regardless of the barriers staying the success of other agencies, have defied the mountain chains, rivers,

seas and oceans, and broadly sown the alimentary plants, at least, entirely around the globe. Even the fishes have been detected in aiding the dispersion of the vegetable family, in eating the fruits of the earth, and then themselves being eaten by land birds which have borne them to some interior point for that purpose. By these agencies, and many others undoubtedly unknown to us, has the dispersion of the vegetable families been accomplished over the earth, and though greatly changed, yet do the original features of the primary regions, impressed in Noah's day, still remain, only embellished and adorned by accessions from other and distant regions.

It was on the second day of February that Noah despatched his little bird the last time to inspect the condition of the earth, and report upon the prospect of future vegetation. Attracted by the multiplicity of seeds, profusely scattered upon the surface of the ground, she returned not again, and thereby informed her master, as well as us, that she was most abundantly provided for and truly satisfied. Thus engaged in gathering food, whole flocks may be seen every February, even in this remote stage of the march of time. Here, in charity to the raven, it may be suggested, that instead of fleshly and forbidden food, he, too, found upon the limbs of drifting trees a sufficiency of such nutritious and pulpy fruits as he was accustomed to, and which, in his usual way, resting his foot upon the branches, he might safely gather. This period was, however, entirely too early for vegetation to spring forth, and from the date the reader may readily understand why Noah remained

within the ark for nearly two months longer. He did not open the doors of the ark until the tenth day of May, and by this time the herbaceous plants and grasses in the surrounding regions have had time to spring and grow. Along the southern plateaus and plains, the soil of Asia is not only fertile but the climate extremely propitious for the early germination and rapid growth of plants. In many portions the husbandman secures two successive crops in the same year, and so profuse is nature in her gifts, that it is affirmed that only a penny a day secures an ample living for man. Perpetual verdure, with a numerous retinue of grains and fruits, in a continuous series, presides over these happy regions and protects the animate races against the invasions of famine. Asia, north of Ararat, presents her widely extended steppes, her broad savannas, as pastures, which furnish sustenance to innumerable herds of horses, cattle, bison and buffalo, stags and deer, and myriads of minor animals. This region is now the paradise of hunters and trappers. Upon the south of Armenia, again, the rivers of Asia abound in marshy grounds that afford cane, rice, flags, rushes and other plants that delight in such soil; and these are surrounded with hills and plains teeming with every species of useful and beautiful vegetation. If so be Asia now, what was her condition in Noah's day? Every farmer is fully apprised of the rapidity with which herbaceous plants and grasses spring up and grow so soon as the earth feels the first genial warmth of spring, even in our temperate latitudes; and he further knows that his hoes and plows must be continually busy, to prevent the ever recurring pests from smothering his

crops, as only a few days' delay on his part is a virtual surrender of his fields.

As a centre for the distribution of animals, as in Noah's case, there is no point on the globe enjoying the same advantages as Ararat, and none that will compare with it. Malte Brun, in writing of Armenia, did not fail to discover the peculiarity of its position, and thus graphically describes it: "There are few countries on the globe where, in so small a space, so many striking contrasts are found united. Within an extent of ten degrees of latitude, we have at Bagdad a heat equal to that of Senegambia, and on the summit of Ararat, eternal snow. The forests of firs and oaks of Mesopotamia join those of palms and orange trees. The roaring of the lions of Arabia echoes to the howling of the bears of Mount Taurus. We might, indeed, say, that Africa and Siberia had here given each other a meeting. This near approach of climates so opposite, principally arises from the great differences which are found in elevation. Armenia, which is a very elevated plain, is encompassed by mountains." In such a country, with such a diversity of soil and climate, and all manner of seeds, recently sown broadcast over its surface, it may readily be conceived, that instead of dying of starvation, or suffering from scantiness of food, during the first year, it was really for them a most luxurious period. It is evident that they might not only enjoy the scattered grains and grasses, the roots and fruits of the Adamland, but revel in cucurbitaceous plants, pumpkins, squashes, gourds, melons, and other nutrimentitious vegetables that would spring up and flourish spontaneously over the earth.

Armenia enjoys one other advantage as a centre for distribution, that should not be overlooked. Tradition as well as reflection teaches, that for many years after the Flood extensive marshes and morasses would continue to exist, owing to irregularities in the earth's surface, not yet filled in by postdiluvial rains and floods. Europe, now much lower than Asia, from her geological features is held to have been the latest continent that became dry. Maps have been prepared, exhibiting her, in the tertiary period, as largely overspread with water, with a few islands here and there above its surface. Tacitus, who wrote about the year seventy of our era, describes Germany as a mass of inaccessible marshes; and the learned Rudbeck makes a similar affirmation in relation to northern Europe. Plato affirms that men, animals and plants inhabited the mountains and their bases, before they spread themselves over the plains and coasts. In all which, we find nothing that reason would not dictate as perfectly natural, and yet so simple as scarcely deserving a place in philosophical records.

From Ararat as a centre, we find chains of mountains, diverging in every direction, as spokes from the nave of a wheel. These were the guides and highways for the races of man and beast, and by them were they conducted over the different parts of the earth. The African chain, on the east and north of that continent, are connected with those of Asia. Taurus continues its extended length throughout Southern Europe to the very Atlantic, enjoying different names as it progresses. The Oural would take the bears, foxes, wolves and rats to the Arctic

regions, whilst the Hindoo Kosh, and its connections and transverse lines, would guide the wandering races as well to China in the east as to the tropical regions of the coast. From Ararat, also, is a continuous chain to the northeast, running into the very extremity of the narrow peninsula of Kamschatka, from which point most probably the straggling tribes found their way to America. By these mountain lines it is most natural that animals should be guided in their wanderings, for in a limited space, by their elevations they would present varieties of climate for their comfort, and the different kinds of food adapted to their several natures. Asia, Europe and Africa, as races grew and multiplied, received a distribution of their first denizens, near to and along the lines of the cairns, cromlechs, and other arkite structures, which man himself subsequently erected in the course of his migrations.

The Aleutian islands, standing in such close proximity as to closely resemble the piers of some ancient bridge, were formerly, no doubt, more continuous than at present. Volcanoes, earthquakes, and subsidences, have ever been busy with physical geography in that portion of the earth, and assure us that great changes have occurred. For centuries past, it is known that the currents have been and still are engaged in washing away the islands, and enlarging the spaces between them, so that their present position can only be received as suggestive of their first estate. None can doubt that many of the races now upon the peninsula, with their fearlessness of water and roving disposition, would venture to swim from island to island in search of fresh pastures,

were they not deterred by the hostile manners of their inhabitants. Foxes and mice are found existing upon them, and neither of these species have any relish for cold bathing. Kamschatka, as well as the islands, abound in gobseberries, raspberries, and the barberry, with luxuriant pastures of the finest grass. The peninsula teems with droves of foxes, sables, hares, ermine, bear and reindeer; the coasts with fine fish, and the birds are remarkable as well for their great number, as for the variety of the kinds. The cold of this region is never very intense, as the sea fogs preserve a comparatively temperate state of the atmosphere, and some of the rivers have never been known to freeze at all. The opposite coast of America is still more mild and equally abundant in its vegetation. This peculiar temperature in so high a latitude, is owing to "the Gulf stream" of the Pacific, which attempers the climate of this narrow basin, and its adjoining coasts, with the heated waters from the equator. To this influence is California indebted for the steady and happy mildness of her seasons. This portion of the world is not as frigid and inhospitable as many suppose, who judge from latitude alone. The isothermal charts assign to it a temperature but little above that of the city of New York, where the mean average of winter is 30°, and that of summer 71° of Fahrenheit's scale. Any animal, native of North America, may easily have passed over these isles, without being subjected to a greater degree of cold than they now suffer in their present homes. Even at zero, in the Southern States, all the wild races, opossums and raccoons, rabbits and hares minks and

skunks, wild cats, foxes, deer, and panthers, not only manage to survive, but actually exhibit unusual activity. All the North American races certainly may have crossed upon the Aleutian islands, and most probably were tempted to do so in the summer season, when the fruits and pastures were most enticing. Even at this era, droves of bears, wolves, foxes, and others, continually cross to and from Asia and America upon the ices around the pole.

As if to repress and smother the idea of a possibility of deriving all the animate races from a single Caucasian centre, some have boldly affirmed that no animal possessing sufficient vigor to withstand the extreme cold of the north Pacific, could possibly endure the heat of the torrid zone, and thus pass through it, to reach the temperate zone of South America. Such an assertion could only have been made without reflection; for on the western coast of America, two different roads, of opposite kinds, present themselves for the accommodation of wanderers. One warm and mild, upon the low lands along the entire coast; the other upon the mountain top, sufficiently cold for the polar bear to travel to Patagonia and drink ice water throughout his journey. The idea conveyed in the affirmation, is that of great heat, as associated with the word "torrid;" yet it should be remembered, that everything within the geographer's tropical lines is not necessarily hot, or even of a fervid nature, for ices and perpetual snows reside in that burning zone as well as animals. The difference in elevation marks the difference in climate, and designates the characters of the mammal, equally as well as the vegetable tribes. Tested

by this standard, it will be ascertained that the peculiar races of South America may well have passed the bridge upon which all others crossed, and suffered no discomfort in the pleasant heights of Central America, or the sloping sides of the Cordilleras, even in the torrid zone.

The only species of bear known in South America ascends to the height of sixteen thousand feet immediately upon the limits of the snow-line.

Skunks ascend to the height of nine thousand feet. The puma ascends in Chili to the height of eleven thousand feet, just below the snow-line in that latitude. In the Andes of Peru, the jaguar roams at the elevation of three thousand feet, and the ocelot at twice that height, above the level of the sea.

The tapir, or American elephant, left some members of the family behind him, which still reside in China, Malacca, and the adjoining islands; but in both hemispheres they exhibit a predilection for great elevations. Those in South America roam from Nicaragua to latitude forty degrees south; one species relishing the very cool temperature of six thousand feet above the sea, and the other regaling themselves upon the very tops of the Andes in New Grenada.

The peccaries, the only indigenous representative of the swine family, inhabit the dense forests from Central America to Paraguay, and climb the eastern Andes to an equal height with the tapirs.

The district of the sloths extends from Central America to and inclusive of Brazil, and they live in the forests east of the Andes, at an elevation of three thousand feet.

Armadilloes, from the Orinoco southward, are widely diffused over the continent, but in the plains of Paraguay and La Plata attain their greatest size and numbers at the same height as the sloths.

Ant-eaters are found from Colombia to Paraguay, and from the Atlantic to the foot of the Andes, three thousand feet above the ocean.

The llama, styled the American camel, and in all respects, save the hump, resembling the "ship of the desert," with their relatives, the paca and vicuna, range upon the mountain sides and summits, near the regions of perpetual snow, from Cape Horn to Caraccas, where their favorite food, the ichos plant, ceases to grow, and beyond which point they never appear.

Every three hundred and fifty feet of elevation changes the temperature as much as one degree of latitude; and hence it may be seen that whilst these races inhabit the torrid zone of the geographer, they sensibly select its colder regions. The general height of our Blue Ridge mountains is between three and four thousand feet, and at that altitude, even in summer, the days are pleasant and temperate, but the nights are cold, and demand adventitious aids for comfort. Any animal that lives at such elevations, even in tropical countries, could certainly withstand the summer temperature of New York, or the Aleutian islands, and at that season pass without difficulty from Asia to America. Having crossed, approaching winter would naturally urge them southward, and luxuriant pastures would still further invite and longer detain them.

But there are other practicable methods by which a portion at least of the mammalia of South America

may have reached that continent from other sources, and these are referred to as confuting the unjustifiable assertions of dogmatism as to such a possibility.

The migrations of the different races, both accidental and designed, are often very wonderful and curious, and no less so than constantly occurs with the vegetable tribes. Sir Charles Lyell enumerates many interesting cases of all classes of animated beings, some in the egg, and others more fully developed, transported to great distances against their will. We cite a single case for illustration:

"Mr. Guilding, living in the island of St. Vincent, says, that it is worthy of being recorded, that a noble specimen of the boa constrictor was lately conveyed to us by the currents, twisted round the trunk of a large sound cedar tree, which had probably been washed out of the bank by the floods of some great South American river, while its huge folds hung on the branches as it waited for its prey. The monster was fortunately destroyed after killing a few sheep, and his skeleton now hangs before me in my study, putting me in mind how much reason I might have had to fear, in my future rambles through the forests of St. Vincent, had this formidable reptile been a pregnant female and escaped to a safe retreat."*

Other reptiles and amphibious animals, and even shell-fish, have been transported upon floating timber for great distances, and it is by no means incredible or impossible that the sloth, armadillo, and other insect eaters may have been borne from Africa across the ocean, by the equatorial current, in a similar way; especially as all those that live upon insects, are by the naturalist said to "be capable of undergoing a total deprivation of food for an almost incredible time."

* Principles, 623.

But why suggest difficulties, and indulge in positive assertions, as to what must or may have occurred more than four thousand years ago, or during the intervening ages? What changes may not have supervened in that time, not only in the animate world, but even in the physical features of the earth itself? Profane history affirms, that in the earliest ages the great Atlantic was spanned by a bridge of large islands from side to side; and the fossil page declares that the bridge that connected the present diminutive races of animals, with their ancient gigantic forefathers, has been also swept away by time. To judge from the puny descendant, with his insect-eating habits, what his huge herbivorous ancestor did in Noah's day, can at best only end in speculative opinions.

The tapir of this day, of the size of a cow, was represented by the tertiary "Dinotherium,"—an animal eighteen feet long and larger than the mastodon: it seems to have been fond of the water, and partially aquatic in its habits. The megatherium, combining the characters of the ant-eater, armadillo and clamyphorus, was twelve feet long, eight high, and five feet broad across its haunches; its feet, terminating in huge claws, were three feet in length, and its tail larger than that of any other known animal. Instead of ants and insects, it lived entirely upon roots. The mylodon was nearly the size of the modern hippopotamus; was eleven feet in length, and seems to have united the organizations of both sloth and armadillo, and to have lived upon the leaves and branches of trees. The glyptodon, deemed to be the gigantic progenitor of the present diminutive armadillo, was cov-

ered entirely with horny plates, articulated together with a sheath of the same nature, enclosing a great tail. Its length was fourteen feet. When we consider the very great differences existing between the present dwarfed races in South America and the former gigantic creatures that may formerly have lived in the very same realms, of an herbivorous character, and perceive in the fossil remains of other huge creatures of that early period the characters of several combined in one—as in the toxodon, the conjoined features of the rodentia, ruminantia and cetacea, or whale species; and in the macrauchenia, the characteristics of the tapir, camel and giraffe combined—we feel admonished as to the perfect futility of all speculations in relation to their ancient movements.

All the animals of the first ages after the Flood were giants, and chiefly differed from their degenerate descendants only in size. The immense mammoth and mastodon attained the height of fourteen feet, a length of sixteen feet, and a weight of at least twenty thousand pounds. The rhinoceros and hippopotamus seem to have quadrupled in size and dimensions their successors of the present day. Bears were as large as modern horses, and the ancient deer, or stags, as the sivatherium of the Savilik hills of Himalaya, attained the proportion of Asiatic elephants. Birds, reptiles, and the tenants of the deep, all exhibit corresponding analogies. The forms of these ancient creatures, buried by the drift of the Flood, or inhumed during their wanderings by landslips from the steep mountains, have been preserved, whilst their degenerating progeny, dying upon the surface, have all returned to dust; and thus has the

connecting link, the bridge between the two extremities, been entirely removed. Thus, too, it may have been with the great bridge of islands across the ocean, which Plato fully describes as having existed in the earlier history of the present earth. As it may not be devoid of interest to many, and will save laborious research, we submit an abridgement of his description of the ATLANTIS, based, as he avers, upon the account as given to Solon, one of the wise men of Greece, when traveling upon the Nile, by an Egyptian priest, near Sais:

"These writings (the Egyptian sacred records) relate what a prodigious force your city once overcame, when a mighty warlike power, rushing from the Atlantic Sea, spread itself with hostile fury over all Europe and Asia. That sea, indeed, was then navigable, and had an island fronting that mouth, which you in your tongue call the 'pillars of Hercules;' and this island was larger than Lybia and Asia put together; and there was a passage hence for travelers of that day to the rest of the islands, as well as from those islands to the whole opposite continent that surrounds that sea. For as respects what is within the mouth here mentioned, it appears to be a bay with a kind of narrow entrance; and that sea is, indeed, a true sea, and the land that entirely surrounds it may truly and most correctly be called a continent. In this Atlantic island there was formed a powerful league of kings, who subdued the entire island, together with many others, and parts also of the continent. Subsequently, however, through violent earthquakes and deluges, which brought desolation in a single day and night, the Atlantic island was plunged beneath the sea, and entirely disappeared; whence even now, that sea is neither navigable nor to be traced out, being blocked out by the great depth of mud which the subsiding island produced." *

* Timæus, Sec. 6, 329.

In other parts of his writings, it is referred to as lying before, or opposite to, "the Straits of Gades," now known as Cadiz, and is described as being 30,000 stadia in length and 2000 in breadth, as in a high degree fertile and productive, and abounding with pasture and arable lands, with forests and metals. In the northern parts were various mountains, dotted with villages and handsome dwellings. The inhabitants were numerous and powerful, and distinguished both in arts and arms.

Plato is not the only ancient author who has referred to the ancient Atlantis, for it appears that one Marcellus, who wrote an ancient history of Ethiopian affairs, affirms, "That such and so great an island once existed, is evinced by those who have composed histories of things relative to the external sea. For they relate, that in their times there were seven islands in the Atlantic sea, sacred to Proserpine; and besides, three others of an immense magnitude, one of which was sacred to Pluto, another to Ammon, and another, which is in the middle of these, and of one thousand stadia in length, to Neptune."

The existence of such islands is also alluded to by Plutarch and other writers; and the Greek poets are eulogistic of the glories of the Hesperides, or western gardens, whence they obtained their oranges, or golden apples as they called them, guarded probably by the anaconda. Notwithstanding all these positive and circumstantial testimonies, some of the learned men of France have so ingeniously criticised Plato's account, that these islands have rather shared the fate common to all things of remote antiquity, and are generally received as a simple myth.

Yet, as learned men have often erred, and by sophistical reasoning led others into the same errors with themselves, it can by no means be accepted as a certainty, that they are correct in the present instance. From the proofs it may be deemed, if not very probable, yet certainly possible, that Plato's Atlantis did exist. Others, equally learned as the French critics, have advocated the existence of these islands, although in their discussions they have differed as to their precise situation. None doubts that some highly favored region was referred to by the Greeks as the Hesperides, yet their position cannot now be divined, and the happy gardens are no longer to be found. The mention of Cadiz, the Straits of the Mediterranean, the great extent of the Atlantic, the joint lengths of the islands aggregating 2000 miles, with the existence of actual continents surrounding that great and true sea, would imply the most remarkable power of guessing; a faculty equal if not superior to actual knowledge. Physical geography, too, lends great support to confirm the existence of such islands. The mountain chains of Spain and Portugal terminate abruptly on the coast from Lisbon to Cadiz. The rock of Gibraltar itself, with its perpendicular faces, is an exception to the general law of the Atlantic shores. South of the Mediterranean, upon the northwest coast of Africa, stands Mount Atlas, with his steep and precipitous face to the Atlantic, and his feet bathing in its waters. Both Gibraltar and Atlas are looking towards the West Indies and the Caribbean Sea. In equatorial South America, chains of mountains exist with their faces towards the east, and, as Humboldt states, entirely

disconnected with the Andes. Upon the opposing shores of the ocean, it would seem as if the old abutments of the ancient bridge were still remaining and confronting each other. This, too, lies directly in the earthquake region of the earth, in which, in times past, many portions of its surface have been converted into lakes and seas. The Caspian, the Black, the Dead, and the Mediterranean by instalments, forcibly suggest to us their fate, and indicate that the same may have befallen the old Atlantis in the manner detailed by the priest of Egypt.

That Mount Atlas once extended across the Atlantic is rendered somewhat probable from the monuments found in Mexico and Peru. The tower of Babel, afterwards the temple of Belus, was built by Nimrod, one of Ham's descendants. Other sons of Ham have from the remotest ages resided in Egypt, and by them were erected the great pyramids. No other branches of Noah's family have ever been known to build such gigantic monuments. To Central America, the passage from Egypt over the Atlantis would have been easy, inviting, and direct; and as that race seems to have had a predilection for and a high appreciation of rainless homes, here again would they find attraction, and be induced to settle. In Mexico is found a perfect duplicate of the tower of Babel in all its parts. Pyramids like those of Egypt, and some of even greater size, are extremely numerous. The walls of temples in both countries are inscribed with hieroglyphics, and a similar civilization prevailed in both countries. The ancient Indian tradition, preserved by Humboldt, that the civilization of America was introduced by an old man from the east,

wearing a long and bushy beard, lends further support to the evidence of the monuments. The ancient people have long since passed away, their hieroglyphs and monuments still remain, with none to unravel their meaning. Their origin must ever remain as clouded in doubt as the existence of the Atlantic islands; but with this difference in their favor, that the learned are estopped from dogmatically pronouncing this ancient civilization a myth.

We can thus perceive how idle it is for us in the nineteenth century to attempt to form any positive conclusion as to the conditions of things four thousand years ago, not only in the animate creation, but in the world itself. Great, immense, inconceivable, and incredible changes have occurred in both, and none the least with man himself, who by whole nations has been suddenly swept away, and oftentimes without leaving a vestige of his former greatness, or even of his very existence. It is not impossible, therefore, that these races reached South America by way of the Aleutian islands; nor is it impossible that they crossed upon the Atlantic bridge; and such have been the mutations in the lapse of forty centuries, it is not at all impossible that some or all of them may have found their way from Asia over the Pacific, especially as the learned say their anatomy discloses some evidences of a cetaceous character. And, in addition to all this, we may safely add, that it is not at all impossible, that these creatures attained their present homes by ways and methods of which we have no conception. Learned as the scientific are, new revelations are daily made to their former stock of knowledge. For a long time it was deemed

wonderful that the same molluscs, or shell fish, should be found inhabiting lakes and ponds widely separated from each other, and even across seas and mountains. A land transit was certainly impossible, and no conceivable method except specific creations could be suggested for their wide distribution. Mr. Charles Darwin, however, by his persistent researches, solved the mystery and placed it in the simplest light. He observed that ducks often bore off upon their bodies, when rising from the water, blades of pond grass. These being placed in his aquarium, soon stocked it with young shell fish, and thus convinced him, that in their infantile state they had adhered to the weed. Further experimenting in an aquarium in which the shell fish were then hatching, he suspended a pair of duck's feet, as if the duck were asleep upon the pond; and upon removal found that numbers of the young molluscs had attached themselves to the feet, and that so firmly, that they could not be shaken off; and that though young, a suspension of twenty-four hours in the damp air did not destroy them. In that period, he remarks, a duck or heron might fly to the distance of six or seven hundred miles, and then be sure to alight in a pond or rivulet, and there deposit its passengers. In like manner, no doubt, have water plants, and even fish been distributed; the seeds of the one and the ova of the other adhering to the feathers, feet, and bills of aquatic fowl. Man is yet a novice in the many wonderful ways of nature.

But still, in South America there is another member of the zoological family, widely separated from his relations, who must not be overlooked.

Monkey, little merry fellow,
Thou art nature's Punchinello;
Full of fun as Puck could be—
Harlequin might learn of thee!

In the very ark, no doubt,
You went frolicking about;
Never keeping in your mind
Drowned monkeys left behind!

Have you no traditions? none
Of the Court of Solomon?
No memorial how ye went
With Prince Hiram's armament?

As with Hiram's armament, and on board of Solomon's Tarshish fleets in their three years' voyages, we find this mannikin roaming, so has it ever been with this prime jester. A fellow feeling has always existed between man and monkey. To-day he holds his levees in all the European courts, and feeds on royal bounty, caressed as well by princes as by people. American citizens, too, do not disdain his merriment, for in this republic he resides, and may yet acquire the right of suffrage. Upon the broad seas, also, he accompanies man, and cracks his nuts, and jests for jolly tars, even amidst the dashing waves. In later and degenerate days, however, he has lost much of his ancient prestige and importance. When Ham's swarthy sons were building pyramids, as well in Mexico as in Egypt, the monkey enjoyed the dignity of a deity, and was adored as one of their many gods. Could they hope to prosper in a distant land, if they should leave their household gods behind in Africa? Surely not. Punchinello and his family must go to America, whether by land or sea. And thus did they go with man, and there have they since

remained, presiding in their appropriate temples. Perhaps other gods, for they had "Gods many," received similar transportation.

Self-esteem is an inherent foible of the human heart. Men in every age have held themselves as superior not only to their contemporaries, but to all that ever preceded them. So universal is this trait, that the sooty and well-tallowed king, in the heart of Africa, after eating his filthy grub, can daily cause his herald to proclaim that now his supreme majesty has dined, all the other inferior monarchs of the earth may go to dinner. Modern European civilization is as but of yesterday. It is less than four centuries since its eyes began to open. Then, with a Columbus to lead, a new world was found, but filled with people and adorned with monuments of a pre-existing civilization, whose very authors, in the lapse of centuries, had been forgotten. A Cook follows Columbus, and discovers that the earth is round, and that multitudes of islands exist in the distant seas, and they, too, abound in numbers of human beings. Slow to believe, even now, that any extensive navigators had ever equaled their Columbus and their Cook in enterprise and daring, to them, the population of the world furnished a deep and intricate mystery. That Columbus was not the first to cross the ocean, in modern times, he himself discloses in the fact, that when he reached the island of Guadaloupe he there found the rudder of a ship. Other Europeans had certainly preceded him. Scandinavians had not only visited Greenland and North America, but even crossed the equator and reached Brazil; and Venetian navigators had crossed the Atlantic seventy

years before Columbus, and discovered Newfoundland. These, however, are only modern instances, occurring at the dawn, succeeding the dark and protracted night of one thousand years that measures European repose—a state from which she was only awakened by a kind jog from the east. If we look back through that thick gloom, we find that other portions, the opposite half, of the world had been wide awake, and actively engaged, even from the earliest times. Ham seems to have been the most spirited and energetic of Noah's sons, and to him and his descendants do the fragments of mutilated history point with emphatic distinctness. The tower of Babel, with the great cities of Babylon, Nineveh, and a host of others, with the Assyrian kingdom itself, sprung into existence at the call of Ham. Egypt, with her sciences, monuments and civilization, acknowledges the restless energy of the same family. They were equally as bold and spirited upon the sea as upon the land. The Phenicians, descendants of Sidon, the grandson of Ham, were the maritime carriers for the whole world in its earlier ages. A narrow strip of fertile land, bordering the Mediterranean, constituted their home. Sidon, the parent city, was distinguished for its mechanic arts, and its manufactures of glass and wool. Tyre, a colony of Sidon, has yet a renown for its purple. The entire coast of Phenicia was lined with many other flourishing and almost contiguous towns and cities, chiefly dependent upon their commerce for their prosperity. These, together with their extensive harbors filled with ships and whitened with sails, presented a scene of mingled wealth and enterprise, seldom equaled in the commer-

cial world. In voyages of great length they exchanged the products of India and the east with those of the west, through the Red Sea, and had their trading points in every port of the Mediterranean. In Sicily and Sardinia, at an early day, they established their colonies; in northern Africa they erected Utica and Carthage as colonial points of traffic; and in Spain the Phenician names of divers cities—Gades, Malaga, Tartessus or Tarshish, and others—still bespeak their active enterprise. They visited Britain and procured their tin, and obtained amber from the Baltic. The western coasts of Africa and the proximate Atlantic islands they visited and explored; and, at the instance of Pharaoh Necho, from the Red Sea they doubled the Cape of Good Hope, and after a two years' voyage returned to Egypt. Their freights were of a varied character, consisting of the productions of very different regions, cereal grains, olives, wines, gums, oil, balm, incense, ivory, gold, silver, tin and iron, with dyewoods and a multiplicity of manufactured fabrics. From the Caspian sea, and perhaps elsewhere, they procured slaves for transportation and sale, and from other regions apes, peacocks, horses, mules, etc. Thus were they engaged, enjoying the commerce of the world on both oceans, from eastern Asia, around Good Hope and to Great Britain, three thousand years before Columbus cracked his eggshell, and more than fifteen hundred before the Christian era. These particulars of their peregrinations have been rescued from oblivion by the fragmental paragraphs of history which have themselves survived the wastes of time. What else they did, to what other regions they extended their travels, and

in what other distant points they established their colonies, is wholly unknown, and scarcely fathomable by conjecture.

But can we for a moment suppose that these scattered scraps of history do contain a record of the wanderings of these ancient mariners? Are we to believe that they who found their way to Britain in search of tin, and to the Baltic for amber, and who, from their visits to the Azores, Madeira and Cape Verde, seem to have ransacked the Atlantic for commercial islands, never thought that there were others in the Pacific equally as good? Is it credible, that in their three years' voyages to eastern Asia, they should have passed around and in the midst of densely studded archipelagos, and yet not discovered their existence? If Cape Verde, or Madeira, would tempt them on the one side, would not Sumatra, Java, and "the myriads of happy islands," with their redolent gums and aromatic spices, their abundant and desirable oils and balms, allure them on the other? But it is not to be denied that they often made a port which was far from their first design, and reached destinations they never intended. So has the civilized European done, even in very late days. "Up to the close of the last century," says Professor Maury, "the navigator *guessed* as much as he *calculated* the place of his ship! Vessels from Europe to Boston frequently made New York, and thought the landfall by no means bad. Chronometers, now so accurate, were then an experiment. The nautical ephemeris itself was faulty, and gave tables which involved errors of thirty miles in the longitude. The instruments of navigation erred by *degrees*, quite as much as

they now do by *minutes*, for the rude 'cross staff,' and 'back staff,' and 'mariner's bow,' had not yet given place to the nicer sextant and circle of reflection of the present day. Instances are numerous of vessels navigating the Atlantic in those times being 6°, 8°, and even 10° of longitude out of their reckoning, in as many days from port."*

The ancient sons of Ham, it is highly probable, did all their calculations by guess, and for compass and sextant used their natural optics in taking observations of the heavenly bodies, when not obscured by clouds. Any landfall by them would be deemed a good one, especially as the varied havens of the Pacific all abounded in treasures. But often, again, mishaps come, and accidents mar the purposes of man. It is incredible that these extensive fleets should have roamed the seas, and met with no disasters in the lapse of two thousand years or less. That they should have often encountered the cyclones of the Chinese seas, the typhoons of the Indian Ocean, and the hurricanes of the Atlantic, is morally certain; and it is equally certain, that their ships were often crippled and disabled, and driven to distant continents or islands, laden with all kinds of fruits and seed, with birds and beasts, with slaves male and female. A new centre would thus be formed, perhaps in mid ocean, from which the wave of human life and lesser beings would spread to the surrounding regions. Otaheite, one of the most charming spots of the globe, and well deserving its title, "Queen of the Pacific," seems to say, that here the enterprising Phenician planted a colony, perhaps as a resting and refreshing ground

* Physical Geography of the Sea, § 97.

on his voyages to Mexico and Peru. The people, in their color and traits differing from the other islanders of the ocean, exhibit in their peculiar civilization, their religious creeds and rites, their customs and traditions a strong affinity towards both the ancient Sidonians and the Mexicans. They were formerly a maritime race, and engaged extensively in navigation. And as all the various vegetable species of Oceanica are found upon this one island, it is presumable that many of them were imported. Many concurring testimonies lead to the conclusion, that this island was really peopled as an ancient colony; and so highly favorable is it for such a purpose, that though we *may* attribute its first discovery to accident, we must impute its adoption to design.

In our day scarcely a month elapses but some vessel is wrecked upon our coast, or driven out to sea, far from her destination. Did nothing of this kind occur to the Phenician, before the European was awakened from his heavy slumber? before he discovered America, and from its western heights first beheld and knew, that there really was a Pacific Ocean? King David, more than a thousand years before the Christian era, records that the ocean then not only had its mariners, but its inseparable dangers. "They that go down to the sea in ships, and occupy their business in great waters; these men see the works of the Lord, and his wonders in the deep. For at His word the stormy wind ariseth, which lifteth up the waves thereof. They are carried up to the heaven and down again to the deep; their soul melteth away because of the trouble. They reel to and fro like a drunken man, and are at their wit's end." "It is only

within these few years, that a British vessel boarded a Japanese junk *within two days' sail* of the California coast, and found that it had drifted, without human care, for many months, and that of forty of the ship's company only seven persons survived. This vessel having lost its course, was carried by the prevailing winds and currents of that portion of the North Pacific to the eastward, and was in all probability wrecked on the American coast, after the living people had been taken out of her and saved.* With instances of a similar character, frequently occurring in the Atlantic, all are familiar. The Phenicians were a bold and daring race, and as the modern American has found his way into every corner of the world, so, too, were they equally venturesome, prying, and ubiquitous. If in two centuries the people on this side of the globe can discover and explore all the regions upon the other, it is certainly incredible that their antipodes, in twenty centuries of activity, should have done less.

Though the complete annals of these ancient merchants and mariners have been lost, the prophet Ezekiel unfolds to us, some idea of the extent and magnificence of their operations:

"O Tyre! Thou who art the merchant of the people of many isles, hast said in thy streets, I am a city of perfect beauty. Thy tributaries have laboured for thy excellence, and thy supremacy is everywhere acknowledged. They have built thy ships of the fir-trees of Senir, and taken the majestic cedars of Lebanon for their masts. They have wrought the oaks of Bashan to make thine oars, and the sons of Ashur have converted the ivory of the Indian isles into luxurious seats for thy seamen. Fine linen with broidered work from Egypt, forms the sails of thy

* Nat. Hist. Human Species, 261.

ships, whilst the blue and purple flag from the isles of Elishah covers and protects thee. The inhabitants of Sidon and Arvad are thy sailors, and even thy wise men, O Tyre, become thy pilots. The ancients of Gebal, and the skilled and proficient men thereof, are proud to be thy calkers.

"All the ships of the sea and all their mariners occupied thy commerce and thy merchandise. The Occidentals trafficked with thee and filled thy marts with silver, tin and lead. Javan, Tubal and Meshech were also thy merchants, and brought to thy people slaves and vessels of brass. They of Togarmah traded in thy fairs with horses and mules. The children of Dedan trafficked with thee. Thy commerce extended to many islands, and they gave thee in exchange for thy wares magnificent carpets, ivory and ebony. The Syrians were thy merchants, because of the multitude of thy manufactures; and they exposed to sale in thy fairs, pearls and purple, embroidered works of byssus, silk, and all sorts of precious merchandise. The people of Judah and Israel were also thy merchants; they traded with thee in pure wheat, in balm, honey and oil. Damascus, in exchange for thy wares, so various and so excellent, brought thee great riches, choice wines, and wool of a bright colour. Dan, Greece, and Mosel traded in thy markets, with polished iron, cassia, and calamus. Arabia and the princes of Kedar were likewise thy merchants; they brought thee their lambs, and rams and goats. Shebah and Raamah came also to traffic with thee; they traded in thy markets, with the most exquisite perfumes, precious stones and gold. Thine were the most distinguished of all the ships of the sea. Thy mariners conducted them upon the great waters. Thou hast been loaded with riches and glory; never was any city equal to thee. Thy commerce enriched the nations and the kings of the earth. Thou wast the queen of the ocean; and thy seafaring men were the terror of all that haunt it. In the time when thou shalt be broken, thy merchandise and all thy company in the midst of thee shall fall, and all the *inhabitants*

of the isles shall be astonished at thee, and *their kings* shall be sore afraid; then shall all the *isles* shake at the sound of thy fall, and all the *princes* of the *sea* shall come down from their thrones." (Ezekiel, chaps. 26, 27, 28, passim.)

To this catalogue, as illustrative of their trade and the size of their ships, may be added the peacock's tongues upon which the Roman epicures feasted, the army of elephants that Annibal transported to Italy, and the herds of lions that were imported and kept to crack and munch the Christians' flesh and bones.

Chronicles more full and in detail no doubt once existed, as a people so populous, opulent and luxurious must have had their authors. Hiram, King of Tyre, loved King David, and was the especial friend and ally of his wise and learned son. Solomon, a thousand years before the modern era, affirms, that in his day, as to the making of books there was no end. Did none of these recount the wonders and dangers of the seas, or relate more fully than Ezekiel's prophetic page, the adventures, the discoveries and achievements of this remarkable people, their friends and neighbors? It is utterly beyond belief, that such a bibliomania should have slighted "The City of Perfect Beauty and the Queen of the Seas." They have perished, and been consumed in the wasting havoc of the past; they were long since burned by Japhet's civilizing torch, and their ashes mingled with the soils of many an Alexandria and Jerusalem. The sons of Japhet, therefore, should not wonder at the paucity of their annals.

Whilst this prime and powerful agency was at work, there were also others of a minor character, alike

engaged in the dispersion and transferring from place to place the plant and insect, the reptile, the beast, the bird and man.

Oftentimes men have in their canoes and smaller craft been seduced or forced beyond the limits of safety, and then swept by winds and waves to great distances from their homes. Several instances we cite from Sir Charles Lyell. Captain Cook found on the island of Wateoo three inhabitants of Otaheite, who had been drifted thither in a canoe, although the distance between the two isles is 550 miles. In 1696, two canoes, containing thirty persons, who had left Ancorso, were thrown by contrary winds and storms on the island of Samar, one of the Philippine islands, a distance of eight hundred miles. In 1721, two canoes, one of which contained twenty-four, and the other six persons, men, women, and children, were drifted from an island called Farriolep, to the island of Graham, one of the Marians, a distance of two hundred miles. Kotzebue relates, that one Kader and three of his countrymen left Ulea in a sailing boat, when a violent storm arose and drove them out of their course; they drifted about the open sea for eight months, according to their reckoning by the moon, making a knot on a cord at every change. Being expert fishermen, they lived entirely on the produce of the sea, and when the rain fell laid in as much rain water as they had vessels to contain. Captain Beechy recites the case of three canoes, laden with one hundred and fifty souls, that left Chain Island, three hundred miles eastward of Otaheite, that were dispersed by the monsoons. Two of them were never heard from, and the third was drifted to

the distance of six hundred miles, securing provisions from such islands as they touched.

The same author recounts many interesting cases of the transport of animals on floating islands of matted trees, many of them standing erect. On one of these rafts, in the Amazon, were seen storks and monkeys, sitting side by side; on others, ducks and squirrels; and upon a large cedar, a crocodile and tiger cat were sitting, each distrustful of the other. On the Parana, during a flood, a large raft was borne down, carrying upon it a motley crowd of alligators, tigers, squirrels, and other quadrupeds, and four of these tigers were landed in one night, at Monte Video, and were found prowling the streets in the morning, to the terror of the inhabitants. Similar floating islands have been often seen by navigators in the Pacific Ocean, and by their means, in the course of a long line of centuries, have the lighter animals, birds, and insects, as well as plants, been transported to new and distant homes.

The European, in 1492, then more addicted to the sword than the sea, strongly solicited by two corpses of the strange and unknown red man, which the gulf stream had thrown upon the beach of the Azores, spread his sails for the westward to find their homes, and landed upon the American shores. Beginning with the dwarfed and lubberly "Santa Maria" of Columbus, in less than four centuries he has traversed every part of the ocean, and made his home in its midst. The whole of America has been entirely remodeled, and is now tenanted, not only by the men of all nations, but by the beasts and birds, fruits and plants of the most distant and widely separated climes. Reviewing what he

has done in so brief a period, would it not be marvelous in his eyes had he found the Americas an unoccupied wilderness, and all the islands but silent blanks in the ocean? He would have wondered that in the thirty or forty centuries previous, none before Columbus had left the steadfast land, and ventured upon the unstable water; that none in barks, canoes, or rafts had been, against their will, snatched from their homes, and swept to some of the "myriads of happy islands." This would have surprised him much and naturally, and yet he does affect surprise, that he actually found them occupied, as his own limited experience has taught him, they should have been.

In this comprehensive view of the Universal Dispersion of all things, animate and inanimate, the mind must be obtuse indeed, that is not deeply impressed with the varied manifestations of Divine Wisdom and Power. All the agencies of physical nature are found actively subserving their Master's will. He who gave commandment to His creatures, "to multiply and replenish the earth," is "seen bringing the winds out of his treasuries," and "riding upon their wings," establishing "his *way* even in the whirlwinds," "making straight his *highways* in the desert," and upon the mountains, and defining "his *ways* in the sea, and *paths* in the great waters," to facilitate its execution. These "testimonies are sure and wonderful," yet "righteous and very credible," and every way worthy of serious meditation.

Well might the Psalmist exclaim, "Thy testimonies are my delight;" for by such contemplations of Deity are all the faculties of the soul enlivened and enlarged, ennobled and exalted.

CHAPTER VII.

SPECIES.

While the mystic twist is spinning,
And the infant's life beginning,
Dimly seen through twilight bending,
Lo! what varied shapes attending!

Now they wax, and now they dwindle,
Whirling with the whirling spindle.
Twist ye! twine ye! even so
Mingle human bliss and woe.

THE written volume of the great Author, we have heretofore seen, declares that the sons of Adam, in the olden time, were giants four times as large, or twice as tall and broad, as the present races; the other volume, in its fossil tablets, makes a similar revelation, in regard to the other races that lived before the Flood. All were giants then, and from them did Noah make his selection, "to keep seed alive upon the face of all the earth." But this ancient colossal race no longer exists. Those that now roam amidst the tombs of the antediluvian monsters no longer attain their primitive size, and in comparison with them are but pigmies. Is it possible that these dwarfed creatures are the descendants of the giants?

One school of philosophers dogmatically answers this question in the negative, affirming that this first race was utterly annihilated and extinguished by the glaciers, and that the present is entirely a new

creation. And from the differences that it finds between the members of the same families—between two or more squirrels, rats or bats, for instance—this school further insists, that these several "*species*," as it pleases to designate them, were so created in the beginning, and have through all their generations severally preserved their first peculiar characteristics. A similar opinion it holds in regard to the vegetable kingdom, and as it finds these variant forms of plants and animals widely distributed over the earth, each in zones and regions happily adapted and adjusted to its particular organization, the conclusion with it becomes irresistible, that all these numerous species must have been separately created and placed in many "specific centres," from which, as they increased, they radiated to the regions surrounding, and now respectively occupied by them. This is the interpretation placed upon the page of nature by that school.

The other class of philosophers hold the opposite opinion, reading nature's book in a different way, but with equal familiarity and comprehensiveness; and some, even the learned Linnæus, the father of the modern systems, among the number, have believed and asserted, that even plants themselves may have diverged from one common centre. These opposite interpretations well illustrate the poet's affirmation:

> "That the difference is as great between
> The optics seeing—as the objects seen."

The first of the above theories is certainly a very simple and easy way of explaining the many differences existing between the plants and animals, and

wholly dispenses with the idea of their dispersion ; for it at once cuts the gordian knot, and avoids the labor of untying it. But such a method will scarcely be received as a philosophical answer to the legitimate question, as everything is at once assumed in the idea of species. To kill and to make alive is certainly one of the attributes of Deity, yet, with our knowledge of His ways, it is incompatible to suppose that He is ever engaged in extinguishing species, merely to supply their places with new creations, which differ but little in form from those destroyed ; and more especially so, when He himself has told us that the sixth day ended his work, and on the seventh He rested.

Neither is such theory consistent with our belief of his All-seeing eye and his Almighty wisdom, to have egregiously overlooked many parts of the earth, in the creation and selection of "specific centres," for the creatures of his hand. To say nothing of others, nothing as to the partial distribution of many nutritious and essential plants, the whole of America was unprovided with a single cow, although the pampas of Brazil amply attest, by herds numbering millions, how extremely well adapted they are for their existence ; neither a horse, though the prairies now teem with their numbers ; no swine, although it is the chief food of forty millions of people. Dogs, cats and rats, with birds of the poultry kind, find in America such a happy adaptation to their organization, that it is wonderful that some of them did not obtain a specific centre here.

Neither is such theory compatible with the most common and familiar scenes around us, whether in

animal or vegetable forms. What varieties are not constantly present, what changes are not continually occurring, within the pale of domestication!

Every species, it is said, engenders others perpetually like itself. This dogma, founded on the laconic truism that "like begets like," is partly true and partly false, and, as generally used, leads to the grossest fallacy. Like can only beget its like when all the accompanying conditions are alike. Like causes will produce like effects, exhibits the truism with its ellipsis supplied, and may be accepted as an axiomatic truth.

The great book of nature, when fairly interpreted, discloses a truth that exhibits at once the power and the beneficence of the Deity. It undeniably affirms, what is most plainly written, that by the mysterious impress of the creative hand, from the very beginning, each race has borne within itself the seeds of its own kind; and this they still continue to do, and so effectually, that each particular *kind* is readily recognizable, though appearing with endless diversities, and at times as deformities and monstrosities. Each, at the outset, received a stamp which time itself, with all its levelling agencies, has never been able to erase.

The rule deducible from the field of nature is perfectly clear and simple. The Creator has imparted to all his creatures, vegetable as well as animal, the faculties of migration and locomotion, to empower them to change their haunts and homes as comfort or necessity may require; and as essential thereto and inseparably connected therewith, has superadded such elasticity of constitution and expansibility of na-

ture as effectually enables them to adapt and adjust their organizations to such changes when properly made; and that these elastic and expansive gifts are measured and controlled by the locomotive endowments naturally exercised; any violation of which law, in making transfers from place to place, is surely attended by disease or death. Thus interpreting nature's page, we can readily understand the various phases presented to us in the animate world, and comprehend many provisions relating to ourselves.

The plants called cryptogamic, with infinitely small seeds that are endowed with the greatest powers of migration, and are blown by the winds to the extremities of the earth, furnish an illustration of the highest degree of elasticity. They live around the arctic circle, on the tops of all the high mountains, even in the torrid zone, preserving in all these cases an identity of form, but as soon as they descend from Alpine heights to a lower level and a warmer temperature, they exhibit new features and are designated as different species. The alder, willow and other plants, with small seeds fitted for the widest migrations, live around the pole, but with forms differing from those of the warmer regions. The tobacco plant, with its small seeds, grows in every latitude, but invariably changes its character with its climate. In these cases there is evidently a power of adjustability imparted to these plants commensurate with their natural locomotion; and the differences now found existing in their respective ranks is no evidence whatever that they were created in these specific forms in the beginning.

The insect tribe, as analagous to the cryptogamic

in plants, may be taken again for illustration. The gnats and mosquitoes are wafted by the winds to every part of the globe, but adjust their forms wherever they reside. Whether they engage in their mazy dances within the tropics, or beneath the Siberian sun, they only change the outward type, but not the inward nature. In the fishes of the sea, this rule is most beautifully exhibited. Many of them annually leave the frozen seas of the north, and hurriedly seek the warm waters of the South. To accomplish this, a great expansibility of constitution is absolutely requisite. But they do more than this; for they leave the salt water of the ocean, and betake themselves to the very sources of our fresh-water mountain streams. This again requires an adjustment of organization really greater than a mere change of temperature in the same element. But as if to aid them, the Almighty has prepared two great rivers in the ocean, pursuing opposite directions. The one, beginning with the heat of the equator, gradually grows colder as it proceeds northward; the other, nearer the land, slowly exchanges its arctic temperature for summer heat, as it flows towards the south. One of these he may take, either going or returning, and, as he progresses, gradually adapt his body to this great change of temperature, perhaps without being conscious of it. The alteration, however, has kept pace with his natural locomotion. To pass from salt water to fresh, and *vice versa*, he finds another way provided, by which he may modify his organization without subjecting it to any violent strain. In the mouths of all our rivers, for the space of twenty miles or more, the water passes from ab-

solutely fresh to perfect salt, in a manner so gradual and imperceptible, that at no one point can the change be detected. In this transition water, fishes, as is well ascertained, play back and forth, from three to four weeks, each day venturing farther, to attemper their organizations and adjust them to the new and diverse element they wish to enter. When the adaptation is, in this way, completed, they resume their usual speed, and continue their journeys to the sources of the streams to spawn. The little fishes in due time follow their parents to the briny ocean, and whether passing into or out of rivers, this transition water furnishes to them a happy medium for altering and modifying their organs for a change so great. If some of these little ones, however, be detained and kept in fresh water, they will live and even increase, but not be recognized as of the same species with their parents.

The locomotive power of birds exceeds even that of fishes, and their expansibility is immensely great. Those termed "birds of passage," annually leave their warm homes in the south and visit the cold regions of the north, passing from one extreme to the other with a velocity unequaled by any terrestrial animal. Many of them travel without stopping, and in twenty-four hours accomplish a distance of five hundred, six hundred, or even eight hundred miles, so that in a few days they exchange the heat of the tropics for the cold of the polar regions. This requires a rapid adjustment of their bodies, and they must possess a corresponding elasticity of nature. In these flights they, too, are aided by rivers or currents in the air, flowing to and from the poles, which,

like the ways in the seas, gradually and imperceptibly change their temperature, and thus aid them to withstand the sudden shock. Yet they actually outstrip the winds in speed, so great is their expansibility.

Terrestrial animals, with their slower motions, cannot endure such sudden transitions from diverse regions. Man calls himself the only true cosmopolite, but this is only self-adulation. With all his artificial expedients of fire, furs and stimulants, he cannot accomplish what other creatures may do with ease. Dr. Kane and his hardy crew, outstripping the natural powers of man, left their warm homes in the month of May, and, upon the wings of the wind, hurried to the region where even the rocks themselves snap asunder at the command of the ices. Such a sudden transition from hot to cold was more than their stout natures could endure, and the sad result is conclusive as to their temerity. Neither the Esquimaux nor the white bears became naturalized to their inhospitable home in a single bound; but slowly, and in successive generations, were their original constitutions gradually altered and adapted to such intense cold. This law of expansibility is plainly written on nature's page, and furnishes a simple rule for transferring and transplanting not only ourselves, but the different members of the vegetable and animal kingdoms, from and to different regions, with success; and it applies to all things animate, at every stage of development and maturity, and even inanimate matter is subservient to the law, as is attested by the fracture of glass, china, iron, and even steel, by the sudden alternations of temperature.

The diversities in the several families of animate

races, classified as species, are clearly attributable to the elasticity, or plasticity, with which all living things are endowed; and an analysis of their natures unfolds the manner in which they have been produced. As the bodies of all animals are composed of plants, as all flesh is grass, we may properly direct our first inquiry to the nature of the vegetable world.

The earthy parts, or skeletons, of plants are derived from the soil, and soils are ever varying in their character, even in the same neighborhood. Some are all sand, either coarse, fine, or of intermediate grades; some consist of different kinds of clay; whilst many are composed of sand and clay mingled, in an endless variety of differing degrees. Salts and earths of many kinds are necessary for the growth of plants—such as the carbonates, phosphates, sulphates, nitrates, and so on; and these are mingled in the soils in a multitude of endless proportions, no sameness existing throughout regions of even limited extent. In one place some of them may abound to the exclusion of others; and in another the first may be deficient and the latter redundant; some soils are too wet, and require draining; others are too dry and need irrigation; and between these two extremes there is every diversity of moisture. Some are very elevated, and may be either hot, warm or cold, and others are very low, and of various temperatures. One may be perfectly level, whilst others slope away to the different points of the compass, at ever varying angles. All are aware of the great importance of "aspect," or "exposure," even when all other suitable conditions are present, for vegetation; and if we duly estimate the many different combinations of

essential particulars, which are thus presented by soils alone for the development of plants, numbering thousands, we should not be in the least surprised to find a full reflection of this complexity in the vegetable world, and even in the varying of the widely separated members of the same family.

But this consideration relates chiefly to the earthy portion, or skeleton, and comprehends but a slender part of the many components that are absolutely essential to the full development of physical forms. From the atmosphere, plants derive their chief supplies of food, their oxygen, nitrogen, carbon, ammonia, and much of their moisture. Heat, too, is an element of prime necessity, which must be furnished, not in any and indefinite quantities, but in such proportions as the fixed law of chemical affinities demands. Too much is equally as injurious and fatal as too little; and that an exact measure is requisite to perfect assimilations and chemical changes, is well known in the dairy and the laboratory, and in all the arts and sciences. To all living things, too, light is as essential as heat, and different characters are imparted to bodies by the very angles or directions in which the rays of the sun are impelled upon them. The force of this element is strongly exhibited within the tropics, where the flowers and fruits, birds and beasts, all display their rich and gaudy colors; and even the fishes of the sea, and the shells and plants beneath the waters of the ocean, arrayed in iridescent hues, bespeak the genial influences of the sun's rays directly and continuously impinged upon them. Outside these regions, colors become more staid and grave, and continue to grow less blithe and

bright, until they reach the polar circle, where all nature robes in sober white. These differences are due to the degree of refraction that ensues, as the solar beam passes vertically or obliquely through the atmosphere; and are still more modified and varied by the moisture and density that prevail in particular regions. Professor Johnston, in speaking of the manner in which the leaves and organs of plants are affected by the elements surrounding them, says:

"That temperature and moisture in the atmosphere materially control the *speed* and *rapidity* with which their functions are discharged, but the light of the sun actually determines *their* nature. The leaf becomes green, and evolves oxygen in the sunlight; but in the absence of light, carbonic acid is disengaged, and the plant blanches and whitens. Some experiments of Mr. Hunt exhibit the effect of rays of light of different colors on growing plants. He sowed cress seed, and exposed the different portions of the soil in which the seeds were germinating to the action of the red, yellow, green and blue rays, which were transmitted by equal thicknesses of solutions of these several colors. After ten days, there was under the blue fluid a crop of cress of as bright a green as any which grew in full light, and far more abundant. The crop was scanty under the green, and of a pale yellow unhealthy color. Under the yellow solution only two or three plants appeared, but less pale than those under the green; while under the red a few more plants came up than under the yellow, though they were also of an unhealthy color. The red and blue bottles being now mutually transferred, the crop formerly beneath the blue in a few days appeared blighted, while on the patch previously exposed to the red, some additional plants sprung up. Besides the rays of heat and light, the sunbeam contains what have been called chemical rays, that produce effects readily recognizable. It is to these

chemical rays that the functions of the leaf are chiefly ascribable, and to the blue rays that tropical vegetation is due."

The value of these chemical influences of light, needs not scientific analyses to reveal them, for they are patent to the eye. If you walk with a Syrian in his garden of fruits, he plucks an orange, cuts it in two, throws one half away, and presents you with the other. This he repeats again and again, and if you ask him why he is so wasteful, he politely answers, that he only bestows upon his friend, the *sunny* side of his fruits. He has learned, that by light and heat one side of the orange has been better developed than the other. All our fruits, apples, pears, peaches, plums, disclose the fact. The sunny side is plump, rich, juicy and highly colored, whilst the other is hard, green, acid, and only partially matured. Even one side of a peach or plum may thus overshadow the other, and rob it of its necessary food. These constituents, light, heat, moisture, and the gases, are never presented to growing plants in the same place, much less in widely distant districts in the same proportions. They are ever changing and ever varying, and not constant perhaps for a single hour. The true value of light and heat in the economy of animated nature, is in general but feebly appreciated. Dr. Kane found that in the long continued darkness of the arctic night his dogs went mad, and that the mind of man itself seemed to waver and wane; and so much so, that artificial light was necessary to prevent such a calamity. But the full value of both these elements is most forcibly illustrated in the Christian doctrine of the Holy Trinity. All spiritual

truths have corresponding analogies in the material world, and by reference to the latter alone are the former imparted to the immaterial being that dwells within the corporeal frame. Physical things are the ground work of parables and prophecies, and are used as similitudes of things invisible and imperceptible to the material sense. The symbol of Trinity is revealed to us in the greatest orb of the heavens. The orb itself, uplifting and sustaining all things by its supreme attracting powers, typefies the Father. LIGHT, coeval and coexistent with that orb from its creation, yet proceeding from it, denotes to us the Son, that Son who himself announced, in allusion to this very orb, I am the Light of the world. HEAT, also coeval and coexistent with that same orb from its beginning, and yet proceeding from it, betokens to us the animating influences of the Holy Spirit,—the self same Spirit that on the day of Pentecost, with the rushing of a mighty wind, presented itself to the eyes of man, in the *physical form of fire.* The joint operation of these influences is indicated to us in the vegetable world, by the Author of all physical and spiritual truth; "first the blade, then the ear, after that the full corn in the ear." Are spiritual attraction, light and heat essential to the uplifting, the growth, and perfection of the spiritual being, equally so are the material similitudes absolutely essential to the perfect development of physical bodies. The sun, by its greater power, enables the tender stem to overcome the depressing force of earthly gravitation, and push itself upward and heavenward, whilst the light and heat develop the blade, the ear, and the full corn in the ear. To enjoy the full frui-

tion of these elements, whether in the material or immaterial worlds, their unalloyed and undisturbed influences should be continuously imbibed. But in the present disfigured and tortuous earth, where the tumult and disorder of Babel reign throughout all its realms, the fullness of the measure is not the lot of created things. Now, all creation groaneth in a state of bondage, earnestly waiting for the manifestation of a future day of perpetual life and light.

How, then, can like seeds produce like plants, when thus hourly subjected to so many various and ever shifting conditions?

Physiology teaches that plants, as well as animals, in their youthful state, or in the vegetative period of existence, are flexible and plastic, and are then susceptible of modification in physical form. In this first state they may be compared to the handiwork of the potter. The clay, while soft and ductile, may be fashioned into vessels of honor or dishonor, as the potter pleases, yet when glazed and burned, it refuses to yield to other impressions. These vessels are now only subject to the law of expansion, and if subjected to sudden alternations of temperature will snap and break; but by careful adjustment of their natures they will endure, on the one hand, the heat of melted metal, and on the other, the coldest ices. It is whilst young and in the plastic and growing state that animated beings acquire new features.

"As the twig is bent, so is the tree inclined."

Youth is the time to serve the Lord, says the Psalmist, who well knew the ductility of the young, and the inflexible stubbornness of the old.

The little seed committed to the ground contains the vital speck, or germ, surrounded by a sack of starch, to supply it with food in its first helpless period. Proper heat and moisture convert this starch by degrees into a sugary fluid, which the young plant imbibes whilst engaged in forming its roots and stem. In this, its first and tenderest stage, before it draws upon the soil at all, it may encounter serious difficulties in the sudden fluctuations of the essential elements, and thereby receive a permanent impress. Growing on, however, itself its own potter, it labors incessantly to gather together the many scattered atoms that must be united, by the unyielding laws of chemical affinity, to constitute its future body. Some elements may be wholly wanting; others may be present of an injurious character, which it must accept and again eject by root or leaf. The quantities, as well as the qualities, are modified by a change of seasons. The rains may prove excessive or deficient. The winds to-day may bring it a sufficiency of food, and to-morrow none, or that which may be pernicious; they may blow cold and absorb its heat, or hot and dry, and by extracting its moisture cause it to wilt. The sun's rays, intercepted by clouds, or other object, may not reach it at all or only at intervals. Yet amidst this Babel of elements, the plant, whilst plastic, elaborates its body, and in spite of all its difficulties, does maintain a resemblance to its parent. In all this the wonder is, not that the plant should differ, but that it should succeed in effecting the similitude it has accomplished.

The seeds of plants, transferred to a distant soil, not hostile to its nature, will produce a plant in the

likeness of its sire, yet losing some one feature which is replaced by a new one, as the result of a change of position. The seed of this produces another plant, resembling its own immediate parent, but now departing from its grandsire's type, in two new features, impressed by soil and climate. Each succeeding generation departs farther from the prototype, until the plant has adjusted itself to its new home; and thereafter it exhibits a permanence of character which entitles it to the rank of a "species."

To expect or demand of like seeds to produce like plants, amidst such a diversity of changing conditions, is clearly unreasonable. Like causes will invariably produce like effects. The chemist will dissolve his salt in water, and foretell the size and shape of crystals that will be produced. Yet, if he commingles different salts together, he is unable to foresee the exact result. When effects differ, we know that causes differ. No two leaves upon the largest oak can be found alike, as each has, in its delicate state, received special influences not experienced by the rest. One thousand million of people is the enumerated population of the globe, and it would be next to impossible to find any two alike. Brothers born of the same parents, rocked in the same cradle and nurtured under the same roof, differ materially from their parents and from each other; and that, too, in such organic ways, that in the lower races they would be classed as different species. The reason is obvious, that in the corresponding days and hours of their respective lives, they have not received an equable supply of similar atoms, out of which to compose their respective bodies. Were it possible for two

germs, precisely alike, to begin their lives under similar auspices, and to continue to receive uniform supplies of the same materials throughout their growing state, when matured, a perfect similitude of bodies would be the result.

Light, heat, moisture and the gases, animals require as well as plants, and these they obtain from Nature's storehouse of elements, as well as they can, in their multifarious combination. They, too, in their juvenility or plastic state, are affected as plants by the same vicissitudes in the progress of their development. For the earthy parts of their bodies, as they cannot extract them directly from the soil, they resort to the vegetable world. The plant is to the animal, what the soil is to the plant; and the differences in the one are necessarily entailed upon the other. Hence there must be a corresponding diversity in animal forms, presenting us again with "species." From this plain view of the subject, it is evident that those larger plants and animals that confine themselves within particular districts, and grow slowly, and thus take time to select and aggregate the constituents of their bodies, should exhibit less diversity of character, and therefore furnish but few species to the naturalist; and, on the other hand, that those little creatures, the insect tribes, both of the vegetable and animal worlds, inhabiting widely extended regions, and whose existences are as transitory as the fleeting clouds themselves, should present specific differences without number. Whilst a severe strain is necessary to make two species of elephants, three of lions, and a single one of the giraffe, there is no difficulty in dividing the smaller creatures into hun-

dreds and thousands. The coleopterous insects alone, it is supposed, may number eighty thousand species.

The naturalist points to the two opposing continents of Europe and America with satisfaction, as establishing his theory of species. In the north, where the continents are contiguous, or nearly so, and where similarity of conditions prevails on both, he finds that the races are identical. But as he proceeds southwards, and the continents recede from each other, these animate forms begin to differ, and the difference increases continually as the ocean space grows wider. From this he argues, that in the north a transfer by migration is possible, but in the south a separate creation could only place these different species of the same forms on the opposite sides of the ocean. Yet in this he is unreasonable, for, so to speak, the continents themselves are of different species, and differ as much from each other as do their plants and animals. America, washed continually on her eastern shores by an icy river from the poles, presents a cold and dry climate for her beings; whilst Europe is heated and moistened by the vapors arising from the Gulf waters that play upon her western coasts. Spain, France and Italy, with the latitude of southern Canada, yet produce fruits that will scarcely mature in Florida. The one slopes to the west and south, and is inlaid with bays, gulfs and seas; and the other, sloping to the east, enjoys no such internal aids. The mountain chains on the one conform to the parallels, and upon the other pursue the direction of the meridians; thus greatly, in every way, ensuring a diversity of conditions. Were or-

ganic forms to preserve a perfect likeness on the two continents, they would violate the laws of nature, of reason and physiology, and in every such instance perform a miracle. Dr. Franklin procured in London a chest of drawers of the dryest material and perfect workmanship, and transported it to Philadelphia; but here it soon shrank, proved worthless, and fell to pieces, on account of the difference of climate between the two cities. If inanimate matter thus acknowledges the change of atmosphere, how much more should living things, composed of atmospheric atoms, exhibit its impressions.

Professor Maury, after maturely considering the general laws which govern the physical agents of the universe and regulate them in the due performance of their offices, was forced to the conclusion, "that if the atmosphere had had a greater or less capacity for moisture, or if the proportion of land and water had been different—if the earth, air and water, had not been in exact counterpoise—the whole arrangement of the animal and vegetable kingdoms would have varied from their present state."* This opinion of the Professor's was reached from a general and comprehensive view of the earth as a grand whole, and from its nice adaptation to the organic races that exist upon it. But to verify the soundness of his conclusion requires no other or differently constituted earth than the present. Africa, as to the proportion of the essential elements, is as entirely different from South America as if they each existed upon other globes. All the continents differ in their proportions of earth, air, moisture, heat, light and altitude, and

* Phys. Geog. Sea, § 226.

hence the kindred animals and vegetables upon them do display those peculiar features which the soundest philosophy affirms they should possess; and these have resulted not from original specific creations in each instance, but from their elastic and expansive powers exerted in successive generations for adjustment.

By discarding the idea of a separate and independent creation for each particular species, the book of nature becomes an intelligible volume, and displays the benignity of an All-wise Creator, who in the very beginning, by a single volition of the Divine spirit, imparted to each of his creatures the faculty of adjusting themselves to the ever-shifting conditions by which, in all places and through all time, they would be perpetually surrounded. Limited space will only permit the citation of a few cases by way of illustration:

The little humming bird, or "flying gem," with its long double tube, like a double-barrelled gun, claims the whole of America as his own. In all the different latitudes and altitudes, from Hudson's bay to Patagonia, from the lowest valley to the highest mountain top, he is found plucking insects from each gay flower, whilst he mingles pollen with pollen, to diversify the fields that furnish him his food. If in the outskirts we find him clothed in staid colours, and as small as a beetle, yet he gradually increases in size and in brilliancy of feather, as he approaches the equator, where he claims supremacy over the ornate crowd that throng the torrid zone. Dwelling in the most diverse regions, 7000 miles in extent, he enables the

naturalist to write him down for more than 300 species, one twentieth part of all the feathered races.

The rat and mouse family are found most ubiquitously diffused. One of them entered Dr. Kane's box at the poles, and ate his specimens, and other rats would be found doing the same thing at any other place whatever. They inhabit all continents and islands, care nothing for latitude or longitude, are more populous in towns and cities than the citizens themselves, dwell in the garret, the pantry, the cellar and the sewer—infest the barns and the stacks, the hedges, the fields, the marshes, the ponds and the rivers, and greatly delight in ocean navigation. Yet everywhere, and in whatever shape he may present himself, he is as well known to man as to the cat. His great diversity of life furnishes to the naturalist 306 species, one fifth of the mammalia.

The bat family is the most remarkable group in the animated kingdom, and disperse themselves as widely as the rats, which they greatly resemble; some of them, like minks, feast upon the blood of their victims; 219 is the number of their species.

The squirrel tribe inhabits every part of Europe and Asia, from the northern part of Siberia to the kingdom of Siam, and is common in Africa and the two Americas. Although the race is everywhere different, and the species are numerous, yet every one knows the squirrel.

Hares and rabbits abound every where, even drinking ice-water in Greenland and Siberia. In those regions, to conform to fashion, they wear white clothing, but in lower latitudes, with equal complaisance, they dress in other colours. "Rabbits," says Pennant,

"will breed seven times in a year, and bring forth eight young each time; and supposing this to continue without interruption for four years, the numbers from one pair will amount to 1,274,840." Of course their species, as the naturalist computes them, should be multitudinous; and notwithstanding their climatic diversities, hares and rabbits are always recognized.

The deer species range through all the zones. The reindeer, elk and moose prefer the cold regions of the north at this time, whilst the others are found exhibiting specific differences in all the lower latitudes. Formerly the elk extended from the polar regions to the Carolinas; now it is never seen south of Canada.

In all latitudes bears are found, exhibiting different forms, but invariably disclosing the characteristics of the family. Omnivorous in their natures, they indifferently eat fish, flesh or vegetables. They are as sportive and frolicsome as children, even the elderly parents, at times, engaging with their cubs in racing, and the pastimes of bo-peep, leap-frog, and the like. Dr. Kane found the polar bear in no wise different. They broke into one of his provision depots, and were so delighted with the discovery of vegetable matter, that they devoured his ground coffee with evident relish, consumed the old canvas covering, and most rebelliously ate up the stars and stripes, gnawing into the very flagstaff itself, but indignantly rejected his salt provisions, as totally unfit for bears. Thus regaled, they disported themselves by ascending an adjacent hill of ice, and sliding down its slope upon their haunches. Wherein does this bear differ from his fellows, so as to demand a distinct creation? Not

certainly in his white dress; for if color is sufficient to make a species, then are our white and black dogs, horses, and cattle different races; yea, even the little birds and beasts, that frequent the polar regions, change their colors, as they or the summers come and go. The Siberian Tartar owns great droves of horses, and they, from their high and cold climate, are all white or nearly so, and certainly, on account of color, they are not to be disclaimed by their brother bays and blacks; if it arises from its peculiar habits and food, then, according to Mr. Darwin, another new species must be added to the list, as Mr. Hearne, in North America, saw the ordinary black bear swimming for hours, with widely opened mouth, like a whale, catching insects in the water.

Many instances might be cited where species, under new conditions, have entirely changed their habits, and some partially, and others totally, lost the use of particular organs. Woodpeckers are described as living upon the ground, where they inhabit extensive regions destitute of trees; thrushes have become divers, and petrels have assumed they habits of auks. Ducks and geese, from water have changed to land birds, and all our domestic poultry can but feebly use their wings. Some animals, in securing a proper adjustment of their organization to their especial conditions, furnish extraordinary instances of development. In Tartary, and the adjoining countries, where annually one season, with a superabundance of food, is followed by another with a deficiency, the Persian sheep are marked by a large and unsightly hump of fat upon the croup. Angola also furnishes breeds exhibiting many remarkable peculiarities.

The zenu or goitred sheep, for instance, have drooping ears, convex foreheads, short hair, briskets and dewlaps like oxen, and two great lobes of hard curdy fat beneath their throats, like goitres. These are known and admitted to be ordinary sheep, and, therefore, it is not insisted that they are separate species, and were so created. Their peculiarities are not defects or deformities, but provisions and adaptations of nature, to secure in time of plenty a store of food for the season of scarcity produced by parching drought. When the English transported fine wooled sheep to Sierra Leone, their colony in torrid Africa, they discovered that they readily exchanged their wool for coats of hair; and so is it now in the Bahamas, where the people say it is needless for them to import sheep, as they very soon turn to goats. A change from wool to hair may prove sufficient for sheep, but the hairy dogs in Mexico, for comfort, prefer a state of perfect nudity. Dogs are of one species, supposed to be descendants of the wolf, yet present at least fifty different varieties, superinduced by influences both accidental and designed. Did one exhibit the faculty of smelling in an unusual degree, that animal was selected for use, and his talent cultivated, improved and perpetuated in his progeny. In like manner have the different characteristics of the canine race been propagated and enlarged, to suit the uses, tastes, and even the whims of man. Although from his wolfish nature, he is fond of mutton, yet certain proclivities have been cultivated, until he has become a perfect and trusty custodian of sheep. Until North America was discovered, the Newfoundland dog was unknown, and

the origin of this variety is ascribed to a union between an European bitch and American wolf, on or near the Grand Banks, where the first of this race was seen. It is a curious fact, illustrative of the effect of climatic conditions, that all European dogs, when transported to Asia, in each successive generation become more and more similar to the pariah or indigenous dog of the east. The hounds are most rapid in their decline, and except in the form of the ears are very much like the village curs. Greyhounds and pointers, also, degenerate rapidly, with occasional exceptions. Spaniels and terriers deteriorate less; and the former, in eight or nine generations, without a fresh cross from Europe, become not only as good, but far more beautiful than their ancestors.*

Dogs, when in the wild state, hunt like wolves in packs, and if transferred from the temperate zone to either the torrid or frigid, at once lose their faculties of barking and smelling. This clearly evinces a change of nature induced by climate, though it is not otherwise perceptible.

The coffee plant is known originally to have been exclusively found in Africa; from whence it has been transplanted to Arabia, and again in later days by the Portuguese to South America and the West Indies. Between the St. Domingo, the Rio, and the Mocha, the difference is very great, as every lover of the beverage affirms. The nutmeg tree grows in New Holland, in India and China, and yet neither of them furnishes the fragrant oily nut that it yields in the Moluccas; and yet all these may have been planted

* Goodrich, Nat. History.

throughout the islands, from one source, by the blue pigeon. The orange has been acclimated in various parts of China, but it manifests a change of character, in yielding fruit not larger than a cherry. Flinty maize, adjusted to the soil and climate of the Northern States, when transferred to the south, in a few generations loses its original features, and acquires those common in its new home. On the other hand, wheat, rye and barley have been naturalized in the cold regions of Siberia, where they have changed their temperate characters to meet their new conditions. As here the summers are but of a few weeks duration, they hasten to maturity with such rapidity, that their growth is said to be actually and distinctly visible. The fruit tree that in one climate produces the finest fruit, when transferred to another, disappoints the expectation of the orchardist, and secures for the nursery man many maledictions for his frauds. The luscious scuppernong of the Carolinas will grow in the higher latitudes, but its fruit there only evokes from a Longworth a sneering comparison with bullets.

It is everywhere manifest, that whilst plants and animals may by slow degrees spread themselves in different latitudes and regions, according to their several grades of expansibility, yet it is by their elasticity and plasticity of constitution, that they in generations depart from their original types, and exhibit new and specific forms and characters. And this is certainly a very wise and happy provision in the economy of the globe, as it not only exhibits the broad districts of the earth with pleasing variety, but enforces upon the inhabitants of these varied dis-

tricts, the greatest diversity of employments. All may not, therefore, engage in the same culture or pursuit, but each must be content with his own particular surroundings and adaptations, and cannot if he would, appropriate to himself the legitimate birthright of his fellows.

This plasticity of nature, inherent in all animate forms, is by no means a modern discovery. It has been practically exercised for many ages, without any physiological reasoning to invite its use. Jacob well knew that, even whilst in the fœtal state, peculiar characteristics might be impressed upon lambs and kids; a practice which, in this scientific day, might secure for him the reputation of a conjurer. About fifty years ago Messrs. Burgess and Buckley each obtained a ram from the stock of Mr. Bakewell, and in a short period, by care and judicious selection, reared flocks of sheep, differing greatly, not only from each other, but from Mr. Bakewell's original stocks. Three distinct and dissimilar varieties were thus produced. Great Durhams, with short horns, have by successive generations been obtained from common races, simply by careful selection and changing their conditions in life. Brazilian pampas develop horns of great size. Iceland pastures furnish milk and butter, but no horns. Horses, in their different ranges, exhibit every variety of limb, mane, gait and color; and are of all sizes, from the Conestoga to the Shetland pony. Sir John Sebright, an eminent breeder, used to say in relation to pigeons, that he would produce any given feather in three years, but it would require six years to mould the head and beak to a desired form.

To this view of the subject the advocate for species, as distinct creations, opposes several objections. He insists that these plastic powers have only been conferred by the Creator upon those animals that are domestic, and essential to the comfort of man, to enable them to accompany him in his migrations; that the wild animals are not so endowed, and are confined to limited regions. This, however, is but a bold and gratuitous assumption, unsupported by a single fact, and contradicted by a multitude. Horses and cattle are man's most useful animals, and yet they will not endure sudden changes of climate half as well as dogs and cats, wolves, rabbits or rats. Of these useful animals, shipped even from Baltimore to Charleston, without especial care one half the horses and nearly all the cattle will certainly die in the very first season; and the latter are so extremely sensitive to climatic changes, that a removal of only a few miles in summer proves fatal to them. It was with the greatest difficulty that common domestic poultry was naturalized to the climate of America.

In making this objection, the learned naturalist forgets the information that on another page he has imparted—that all animals, when in embryo, so closely resemble each other that they cannot be well distinguished; that in parts and organs a sameness is manifest throughout the races; that the fin of the fish that strikes the water is analogous to the wing of the bird that flaps the air, and to the forearm of the beast that stamps the earth: that the proboscis, the beak, the bill, and varied form of jaws, are all designed to fulfill one common purpose, and bespeak a oneness of design, a unity of plan and a grand com-

prehensive type for all animated beings. It is also known that they are all endowed with the same five senses that we possess, are gifted with the power of locomotion, and are affected, so to speak, with the same passions and emotions, like and dislike, love and hate, exhibit the same parental care and affection for their young, and all pursue one common object in life, that of individual welfare and happiness. Thus similarly created and endowed, it is absolutely incredible that such immense differences should exist between the wild and domestic races, as the naturalist demands to support his theory. We cannot know as well, and study as familiarly, the beasts of the forest, as those that are always with us and about us; yet as they in all other respects agree, we cannot doubt but that plasticity of nature is equally enjoyed by both, and that one common design and law rules the domestic and wild alike.

Again, it is urged that species are in many cases determined by such parts and organs as cannot be deemed variable—such as a particular number of teeth, shape of beaks and jaws, and joints in the spine, and so on. These, however, like all other portions of the body, are composed of earthy and atmospheric atoms, selected and assimilated by the beast, bird, or reptile, as want and opportunity require and permit; and it is difficult to understand why they should be less susceptible of varied combinations than those of form, size and color. All consist of dust and gases, and must, as in the case of the potter, yield to the uses and requirements of the moulder.

Within the domestic pale, where the conditions of life are never constant, varieties in all respects frequently

manifest themselves, regardless of speculative theories. These are not accidental, but result from combinations of matter yielding to natural laws and forces, which the wit of man has not yet unriddled. Some pigs in a litter show fewer spinal joints than others, and some curs are cur-tailed from infancy; some horses and swine never develop tusks; some poultry are entirely destitute of tails; others, with their feathers inverted, answer to the popular name of "frizzlys," and others again, with limbs remarkably short, are called "duck-legs." All our animals, in a greater or less degree, exhibit modifications indifferently in all their parts and organs; and the new features, once acquired, are transmissible to their progeny. The human race itself exhibits the same susceptibility of change, and it is not uncommon to find in the members of the same family, the jaws, teeth and other organs standing in contrast to each other. All the distinctive marks of species are found exemplified in the white race, and yet none can be bold enough to suggest that they are the result of separate creations.

And again it is held, as an argument for the permanency of species, that none of these specific modifications have occurred within the knowledge of man, and as they now are, so do they appear to have ever been within the limits of his observation: and, as irresistible proof, it is furthermore held, that the paintings upon the Egyptian tombs are such perfect pictures of the Egyptian animals of the present time, as clearly establish that they have undergone no alteration for the last three thousand years. This, at first blush, seems very plausible and convincing. But

when the fact is remembered, that the regions in which these races have lived for periods of such length, have remained unaltered, without any change of soil or climatic conditions, the argument is seen to be unsound and fallacious. Why should species alter, when no new adjustments or adaptations are requisite? The animals now remaining in Egypt should as much resemble their ancient progenitors, as the modern valley resembles the same of the olden time; no change has occurred in the one, and none should be looked for in the other. Yet if the greyhound were taken from Egypt to a new climate, to eastern Asia for instance, he, like those of Europe, would undoubtedly soon degenerate into the indigenous pariah; and if the wheat be transferred to America, it soon loses its Egyptian peculiarities by adapting itself to its new home. Changes, too, in some parts of the world may take place, yet so imperceptibly as to escape the notice of the existing generation. Of this, history affords a signal example. England was formerly occupied by a most singular race of people. They appear to have been organized somewhat upon the type of the armadillo, covered entirely with a jointed carapace, of a substance resembling steel or brass. Head and chest, body, arms and limbs, were securely encased by an impenetrable mail, that defied the pike and lance, the claymore and the halberd. They scorned learning and the arts, and deemed it beneath the dignity of even the royal hand to sign the monarch's name. Such trivial acquirements were contemptuously left to another weaponless class known as "clerici." They furthermore seem to have been of the carnivorous order, especially delighting

in human blood, and would with frantic joy, on every opportunity, rush to France or Spain, or even to distant Palestine, to gratify their truculent tastes. Their vocal utterances were also extremely singular, to judge from certain symbols of the same, which in the year 1380, were by a venerable clericus recorded and thus preserved. A brief sample will suffice:

"Also men dwelle to gidre and bi kunnynge zeue ze onour to the womman's freelte as to the more feble and as to euene eiris of grace and of liif that zoure preieris be not lettid, and in feith oon of alle wille in preier be ze eche suffrynge with other lowers of brithered, merciful, mylde, meke, not zildynge yuel for yuel, nether cursyng for cursynge; but azen ward blessynge for in this thing ze ben clepid, that ze wilde blessyng bi eritage."—1 Peter, ch. iii. 7.

That race, however, is now extinct; their fossil remains being yet well preserved in great halls and armories, to attest their former specific character. The modern Englishman affects to boast that he is a lineal descendant of these carnivorous armadilloes, though certainly the scientific naturalist may well dispute his claim. He, of this day, belongs to the soft-shell species; reads, writes and ciphers; nationally keeps a poet-laureate; takes especial delight in little paper billets, imprinted with the stamp of "sterling," and fairly shrinks from the rare but unpleasant duty of slaying Franks and Turks. If really he is not a new creation, a great change certainly has at some time occurred; for now he can scarcely recognize the sounds of his great granddam's voice as jotted down by Wiclif. When, and in what particular generation, did this great transition take place?

New Holland has been often termed a world of

wonders, as its birds, beasts and fruits exhibit a contrast to those elsewhere existing. But *there* they are perfectly natural, and conform to the physical features of that continent; and on that account are fully entitled to their uncouth and unusual forms. New Holland herself presents some most remarkable anomalies, and actually reverses the order of things with which we are familiar. In the rest of the world the mountains consist of primitive rocks, granite, gneiss and mica slate or lava, tilted up into steep slopes and acclivities, whilst the tertiary sands form the plains and deserts; but in New Holland the mountains consist of sands not tilted, or at all inclined, but deposited in level, horizontal strata. Elsewhere, true sandhills, where they occur, present long and gentle slopes scarcely perceptible; but here, upon the Blue Mountains of sand, so precipitous are the lines of lofty cliffs, that a person may easily strike with a stone trees growing fifteen hundred feet below him. In the other portions of the earth, mountain streams arise within their narrow ravines, and, as they extend their length, find the valleys through which they run constantly growing wider. Not so in New Holland, however; for there the streams begin in the widest part of the valleys—even several miles in width—and continue their course, through plains continually narrowing, until they at last escape through mountain chasms too contracted for the passage of either man or beast. Such are some of the features of the Blue Mountain country,* and those of the westward plains are not less wonderful. In the lowland plains of the other continents, the streams

* Darwin on Volcanic Islands, p. 130.

are found to issue from boggy, glady and swampy places, so widespread that the headsprings cannot be distinguished; and these increase in size by the accessions from tributaries flowing from similar indefinable sources. In New Holland, however, the lowland streams seem to be largest at their head, and diminish in size as they increase in length, until they finally lose themselves in the boggy, widespread glady swamps, in the very midst of the sandy plains. These are some of the physical anomalies and inversions of that continent; and from them her animal and vegetable productions have undoubtedly acquired their singularly reversed forms.

This island is a remnant of the primitive world, and in its mountains of pale sandstone, preserves a memorial of the Flood. Mr. C. Darwin has visited and examined them, and from his account is satisfied that these accumulations of sand in their horizontal layers have been deposited by water; and he cites certain existing crystalizations as strong corroborative proof of the fact. He further finds a strong resemblance between these grains of lustrous quartz, and those of the Cape of Good Hope evidently derived from aqueous solution.*

* The grand valleys by which the Blue Mountains and the other sandstone platforms of this part of Australia are penetrated, and which long offered an insuperable obstacle to the attempts of the most enterprising colonist to reach the interior country, form the most striking feature in the geology of New South Wales. They are of grand dimensions, and are bounded by continuous lines of lofty cliffs. It is not easy to conceive a more magnificent spectacle than is presented to a person walking on the *summit plains*, when, without any notice, he arrives at the brink of one of these cliffs, which are so perpendicular that he can strike with a stone (as I have tried) the trees growing at the depth of one thousand to one

By a reference to Captain Kerhallat's map of the currents of the Pacific, it will be perceived, that New Holland stands in the position where opposing currents from the northeast and southwest would meet, and thus conflicting, would form whirling eddies, and deposit their sedimentary sands in these insulated masses and the surrounding almost circular precipitous cliffs. These currents still flow around the sides of the island, and plainly disclose what they would do were it submerged to a sufficient depth. The ancient ferns, converted into coal, lie buried be-

thousand and five hundred feet below him; on both hands he sees headland beyond headland of the receding line of cliff, and on the opposite side of the valley, often at the distance of several miles, he beholds another line rising up to the same height with that on which he stands, and formed of the same horizontal strata of pale sandstone. The bottoms of these valleys are moderately level, and the fall of the rivers flowing in them is gentle. The main valleys often send into the platform great *bay*-like arms, which expand at their upper ends; and, on the other hand, the platform often sends promontories into the valleys and even leaves in them great, almost insulated, masses. So continuous are the bounding lines of cliff, that to descend into some of these valleys, it is necessary to go round twenty miles; and into others, the surveyors have only lately penetrated, and the colonists have not yet been able to drive in their cattle. But the most remarkable point of structure in these valleys is, that, although several miles wide in their upper parts, they generally contract towards their mouths to such a degree as to become impassable. The Surveyor General, Sir T. Mitchell, in vain endeavored, first on foot, and then by crawling between the great fallen fragments of sandstone, to ascend through the gorge by which the river Grose joins the Nepean; yet the valley of the Grose, in its upper part, as I saw, forms a magnificent basin some miles in width, and is on all sides surrounded by cliffs, the summits of which are believed to be nowhere less than three thousand feet above the level of the sea. When cattle are driven into the valley of the Wolgan, by a path (which I descended) partly cut by the colonists, they cannot escape; for this valley is in every other part surrounded by perpendicular cliffs, and, eight miles lower down, it contracts from an average width of half a mile to a mere chasm, impassable to man or beast. The valley of Cox River is similar, and other cases might be added. (Darwin's Description of the Valleys.)

neath these sands, not in saddle-shaped basins, as elsewhere, but upon the primitive plains. Chemistry, with its soluble silica, or liquid glass, reveals a method by which most probably the grains were cemented together, as well to form the brilliant crystals, as the greater mountains; a method which man has adopted, and successfully uses, for the manufacture of artificial sandstone. These elevated cliffs are supposed to be nowhere less than three thousand feet above the sea, and hence we must conclude that the island, in Noah's day, from the oscillations in the internal lava lake, subsided below its present level and was again upraised, or that the waters then, were that much above their present height—a question which would require too lengthy and dry a discussion for our simple elementary manual.

It is, however, a singular fact, and worthy to be noted, that whilst this island, standing on the middle meridian of the ancient world in the Southern hemisphere, was evidently the converging point of the diluvial sands. Great Britain, its antipodes, upon the opposite meridian in the Northern hemisphere, should have been the great focus of the drifting fossils.

But to resume our subject. The vegetable world furnishes abundant testimony, as to the susceptibility of its members to change and modification, according to the conditions surrounding them; and the catalogues of florists and nurserymen are alone sufficient to attest the varied characters assumed by the same kinds of plants. The rose, of all colors, sizes, shapes and forms, and variant odors, numbers two thousand varieties, all radiating, as is well ascertained, from the common Provence rose, which itself was derived from Mount Caucasus, near the

site of the ark. The practiced florist, well aware of the plastic nature of plants, uses his knowledge as a source of profit. All seedling tulips, when they first flower, are called breeders, and are of a dull and uniform color. To make them break, and produce the brilliant colors which constitute their beauty, many expedients are resorted to. At one time they are grown in the poorest soil, and then suddenly transferred to rich loam, abounding in moisture; again the system is reversed, and every combination of soil, heat, light and moisture is by turns employed to induce variety. They are even, at times, from the cities sent ten to twenty miles in the country for a change of air. The flowers of the hydrangea are changed from pink to blue, by removing the plant to a loamy soil, or by surrounding its roots with other elements.

"A little worthless bitter plant," says Sir C. Lyell, "with wavy seagreen leaves, taken from the sea side, where it grew like wild charlock, transplanted into the garden, has lost its saltness, and been metamorphosed into two distinct vegetables, as unlike to each other as each is unlike the parent plant. The red cabbage and the cauliflower, both permanent varieties, have thus been derived from a bitter insignificant vegetable, simply by a change of soil and mode of life."

Man has discovered some of nature's ways for producing varieties, and practices them. At the proper season he takes the pollen from one flower and conveys it to another. The result is a new plant, resembling both parents, the flowers of which have the form pertaining to the plant that bore the seed, and the color of the one that furnished the pollen. In this

method of distributing properties, not only the winds, but the insects, bees, butterflies, and humming birds have been engendering varieties for centuries. In the wine regions of Europe the same grape, even in adjoining vineyards, yields different kinds of wine; and as the seasons vary, the quality from the same vineyard is found to change. Care and culture have converted the sour crab into the luscious pippin, the wild sloe into the plum, each presenting many varieties. In cold soils and climates, where the tender bud in the centre requires protection in winter, the cabbage folds its leaves carefully over it and around it. But where the winters are milder, and such a course would smother and destroy its young, the plant refuses to head. It readily adapts itself to surrounding conditions, and a cold temperature is all that is required to raise the cabbage to perfection. Permanent changes are produced in successive generations, and the proficient orchardist cultivates patience to ensure perfect plants. The Belgian selects the seeds of the most indifferent pears, for instance, and plants them. The scions obtained, he grafts upon quince stocks, to obtain fruit at the earliest day. The first obtained is generally very poor, but that he disregards, and again plants the new seed, throwing away the trees that produced them. New scions are grown and grafted, and these yielding seed are also thrown away; successive generations follow each other, until a perfect variety is secured. By this process it is ascertained that six and seven generations are required for pears, four and five for apples, and three or four for apricots and peaches.

It is generally known that all our nutritive plants, in their native wilds, are neither pleasant nor palatable. When transferred to new soils, climates and

conditions, changes in size, texture, character and chemical constitution, are superinduced, transforming them, as it were, into new and unknown beings. Not only the pineapple and banana, the fig and grape, the peach, the pear, and the melon, but the esculent roots, eminently exhibit this susceptibility of adaptation and amelioration. The Irish potato, described by Humboldt as a little stringy, worthless fibre, growing on the wooded slopes of the Chilian Andes, has assumed innumerable forms and characters, and become the nutritive food of millions. The beet and turnip, from insignificant beginnings, have by culture not only parted with their first unpalatable qualities, but increased in size an hundred fold or more, and become sugary and nutritious in a high degree. It is by the aid of such plants, thus improved, that man has made his Durhams.

To accomplish a change so great, he has improved his soil, by imparting to it those elements—the carbonates, sulphates, phosphates and others—that are essential to their growth. This is all that he could do, but that has converted a little useless weed into a mighty plant. But the obstacles to its further amelioration and true perfection have been only partially removed; it has been still subjected to the ever varying elements which constitute its chief support. It has been at one time drenched with rain, and at another parched with shriveling thirst. The winds that bear it gaseous food have sometimes brought it none, and then again surfeited it with a superabundance—to-day, perhaps, bringing it pestilential food, and to-morrow repressing it with chilling blasts. The sun's light, too, has reached it intermittingly, being

obstructed by flitting or long continued clouds, whilst the heat that animates its body, and matures its nutritious properties, has been extremely fitful and capricious. If, notwithstanding these antagonistical influences, the little fibre, by a culture of soil alone, has been converted into the large and sugary beet or turnip, what would not the plant thus improved become if all the ameliorating stimulants, necessary to full perfection, could be seasonably enjoyed? What if the winds, in equable and unchanging currents, should in suitable quantities bring its daily food; what if nightly dews, instead of rain, should in exact measure furnish its drink; and what if the sun, undimmed by cloud, should drive in unbroken streams its beams of enlivening heat and light to its very core? What would not plants become when stimulated by such an accumulation of forces? At least an hundredfold as large, and an hundredfold as perfect as ours most improved, abounding in albumen and gluten, starch and sugar, oil and the earths, and with every element essential to the development of animal forms. Our ameliorated and showy kinds may suffice to give amplitude to Durhams, but such roots and fruits could only be consumed by dinotherium, sivatherium, mastodon and mammoth; such roots and fruits fed to the dwarfed and perished pangolin and armadillo would soon swell their bony cases, and reveal once more the giant's glyptoden and megatherium of the olden times.

Where, then, could have grown the food that was necessary to the immense development of the ancient races? and in what climate could they have lived to have so successfully aggregated the elements and

embodied them into their grand proportions? Not certainly on the earth as at present formed, with its diverse configuration of continents, hills and mountains, amidst the clashings of all its constituent principles. Not here, even if tropical influences existed from pole to pole, if oranges were growing upon Greenland's icy shores, and crocodiles depositing their eggs upon the Thames. Even then, the contrariant winds, clouds, rains and other antagonistic influences, necessarily resulting from the earth's formation, would frustrate the order of such perfect development. We have now in this "checquered vale," a tropical region of considerable extent, and something of a torrid zone, affording many themes for poets, travelers and essayists, but no such rich and nutritious roots and fruits for man or beast. Even the dwarfed elephant in his torrid home, protected by church and state, petted by priest and king, and arrayed in all the gorgeous robes of royal majesty, proclaims the insufficient nature of his food. So far from increasing to mammoth size, he but slowly engenders his own diminished species; and only a pair of young in each twenty years well discloses a declension of his prolific powers. The present earth, each and every part of it, denies any adaptation whatever for the maintenance and support of the giant forms that now repose beneath its surface. Here they lie interred, but when living, they roamed on other plains—the broad torrid zone of the Adamland. There it only was, that true tropical influences existed in full force for their development, amidst the harmonies of nature, with winds warm and nourishing, steadily pursuing their unswerving circuits—

with nightly dews and genial mists administering their cordial fluids without stint or excess; where light and heat, beneath serene and cloudless skies, poured their continuous streams from heaven's font upon the womb of earth. None but Adamland was ever so blessed, and until the form of the antediluvian world returns, unceasing strife and confusion, with endless varieties of degenerate beings, and a bitter war of races, must conform to their Maker's will.

After this dissertation upon the varied performers on the great stage of life, we can more fully appreciate the opening scene of the drama. In Noah's day the whole earth was one vast garden, profusely and promiscuously sown with rich and perfect seeds and roots from the antediluvian nursery. They grew and multiplied without hindrance for many years, yet in succeeding generations they yielded to irrepressible influences and gradually declined and waned. So, too, the descendants of Shem, Ham and Japhet, in seven generations acknowledged the rapid degeneracy of their natures; as did also the giant beasts of earth. All were waning and all declining, adjusting their primitive forms to their new conditions. It was long before the forests grew and thickened, and with their dense foliage overshadowed the lesser plants, and with their wide spread roots deprived them of their sustenance. Yet the day came, when they were thus stinted, dwarfed and made unpalatable for the races that depended on them for support; and at the end of one hundred years so greatly were they deteriorated, that the beast was tempted to quit his accus-

tomed pastures and invade the cultivated fields of man. Then it was that Nimrod began the hunter's life. It was he who first killed cock robin with his bow and arrow; and with spear and lance drove back the plunderers to their bitter and degenerate forest food. Then they, in turn, fell upon each other, and the strong sought in the flesh of the weak that measure of nourishment that was denied them in the innutritious plant.

Thus, in a single comprehensive view, may we picture to our minds the whole animate creation; man, beast, bird and reptile, with the fishes of the sea, the giant sons of Noah, the ponderous megatherium, mastodon and mammoth; the ancient stag with widely expanded horns, and other huge contemporaries; the tall and towering ostrich and dinornis, with the whole feathered family; the huge crocodiles and leviathans of the deep; all arrayed in martial column, with the vegetable world in the lead, with an even and steady tramp—tramp— tramp, slowly marching down the descending slope of this degenerate world; and so will they continue to move, until a voice from on high shall command a halt, and then will the dwarfed and diminished races wheel, and over the broad plains of rest and restitution, with the vegetable at the head, march with the same steady tramp—tramp—tramp, until they regain the happy and joyous forms of their first high estate. Thus re-instated, they will all dwell together in amity and delight, until the seventh angel sounds the last solemn notes of time.

Here we close the Book of Nature, trusting that

our brief reviewal has assured the reader, that its great Author has impressed on its leaves no other account of His ways and His works, than that He has disclosed through the lips of His servants; and that in truth and in fact, its ponderous pages are so handsomely illustrated with graphic intaglios, they give fullness and completeness to the volume that is written. When accepted together, as they certainly should be, we have both the text and the comment, graciously furnished us by "The Father of light, with whom is no variableness, neither shadow of turning."

CHAPTER VIII.

A MATHEMATICAL SUPPLEMENT.

"Monstrous numbers heap I up,
Millions piling mountain high,
Time unto time I add,
World heaped on world doth lie."—HALLER.

THE geologist, as if conscious of the extravagance of his own speculative conclusions in regard to the immensity of ages, during which he avers nature was employed in heaping strata upon strata, to prepare the earth for man's reception, has felt constrained to make a direct assault upon ordinarily received opinions, and, the better to defend his own, has ingeniously planned a countermine to overthrow the chronological system of his adversaries. He insists that

if his appears to be hugely great, that of his opponents is certainly incredibly small, and very far short of the actual truth. This is geological strategy, undoubtedly intended to produce a dilemma; and the better to accomplish his purpose he appeals to the exact science of mathematics, as an irresistible method by which to measure bygone time.

As the assurances of great men are all powerful with some, and mathematical certainty grown into a proverb with others, this course of argument has proved a stumbling block in the path of many whose faith has otherwise well withstood the force of the most learned, but hypothetical deductions. For this reason we have concluded to examine the geologists' mathematics, to ascertain the real worth of this branch of his demonstrative science, and to enable us the more accurately to appreciate the true power it should possess in unsettling established faith, or even the common chronology of history.

With great confidence he points to the layers of lava, superimposed, one upon the other, around the brows of Etna, as most satisfactorily establishing an endless series of successive centuries for which the earth has existed, that actually defies enumeration. This subject we have before referred to in our chapter on Physical Geography, and by way of elucidating what was there stated, out of many, we cite the case of Graham Island, also referred to in treating of the Flood. In the Mediterranean Sea, not very far distant from Etna, this island, composed of volcanic lava, arose from the bed of the sea, in water six hundred feet deep, in the short space of twenty days. The first shock of the earthquake was felt by

Sir P. Malcolm, on the 28th of June, 1831, when passing over the spot, and on the 18th of July following, John Corrao, the captain of a Sicilian vessel, beheld the crater twelve feet above the surface, from which was pouring volcanic lava, cinders, and an immense column of vapor. Were the discharges of the liquid in this case intermittent, as is by no means uncommon with eruptions resulting from the waves or oscillations in the interior fluid, each outflow would, as layers, cool and harden beneath the sea, before another would be spread upon it; and thus would be presented the phenomena existing upon Etna. And were Graham Island now upheaved with its base above the surface of the water, it would furnish in its accumulations similar proofs of its great antiquity and preadamite origin. Hence it is evident, that the many wrinkles upon Etna's horns are by no means sure indications of her protracted age, as they denote only waves and not centuries of time; and it is by no means impossible that they may have all been produced in some brief period, perhaps even since the Flood.

Again, the geologist assures us, that by his mathematical tests he has well ascertained from the Mississippi delta, that the earth is at least one hundred thousand years old, and consequently scripture chronology must be unreliable. To fairly examine this conclusion, we state the data upon which it is founded:

"From the mouth of the Mississippi, at the Balize, steamboats may ascend the river for 2000 miles, with scarcely any perceptible difference in its width. At its junction with the Missouri it is half a mile wide, and the latter is of the same width with the former, the union of the two producing no increase whatever.

The junction of the Ohio seems also to produce no increase, but rather a decrease of surface. The Saint Francis, White, Arkansas and Red rivers are also absorbed by the main stream, with scarcely any apparent increase of its width, although here and there it expands to a breadth of one and a half or even to two miles. On arriving at New Orleans, it is somewhat less than half a mile wide. Its depth there is very variable, the greatest at high water being 168 feet. The mean rate at which the whole body of water flows, is variously estimated; according to Mr. Forshey, the mean velocity of the current at the surface somewhat exceeds two and a half miles an hour, when the water is at a mean height of eight feet below the maximum. From his observation he infers that the annual average could be 1.88 mile per hour at the surface, and about $1\frac{1}{2}$ mile for that of the whole body of water. On visiting New Orleans in 1846, our author relates that he found Dr. Riddell had made numerous experiments to ascertain the proportion of sediment contained in the water of the Mississippi, and he concluded that the mean annual amount of solid matter was to the water as $\frac{1}{1245}$ in weight or $\frac{1}{3000}$ in volume."

With the width, depth and velocity as above stated, and assuming 528 feet as the thickness of the mud and sand in the delta, founding this conjecture upon the depth of the Gulf of Mexico and some borings in the delta, our author continues:

"The area of the delta being about 13,600 square statute miles, and the quantity of solid matter annually brought down by the river 3,702,758,400 cubic feet, it must have taken 67,000 years for the formation of the whole; and if the alluvial matter of the plain above be 264 feet deep, or half that of the delta, it must have required 33,500 more years for its accumulation, even if its area be estimated as only equal to that of the delta, whereas it is in fact larger."

Even admitting the accuracy of the data, it is impossible to discover the process by which the conclusion has been reached; for a proper combination of the figures yields no such return as 100,000 years. The problem is one of very easy solution, and the unscientific reader need not be alarmed.

As the whole body of water flows with a velocity of about $1\frac{1}{2}$ mile per hour, we know that all the water in the river, for $1\frac{1}{2}$ mile above any given point on the levee at New Orleans, must pass down at the end of that hour. Hence the whole volume of water hourly passing any point must be equal to its length, $1\frac{1}{2}$ mile, or 7,920 feet, multiplied into its width, a half mile, or 2,640 feet, and their product into the depth of the river, or 160 feet. This yields as the hourly volume of water 3,345,408,000 cubic feet. But the sediment suspended in this quantity of water, according to Dr. Riddell's estimate, amounts to $\frac{1}{3000}$ part of the volume; and therefore amounts to 1,115,136 cubic feet. In a day the quantity of sediment is twenty-four times as much, or 26,763,264 cubic feet; and in a year, or $365\frac{1}{4}$ days, it amounts to 9,775,282,176 cubic feet, instead of 3,702,758,000 deduced by geological mathematics, disclosing an error of only six thousand millions of cubic feet per annum.*

It is also estimated that the delta covers an area of 13,600 square miles, and that the depth of the sediment is 528 feet. The whole solid contents must therefore amount to 200,189,214,720,000 cubic feet,

* Charles Ellet, Jr., Civil Engineer, in his Smithsonian Contributions, states the annual average discharge of the Ohio alone, as high up as Wheeling, at 835,323,000,000 cubic feet, the result of six years' observation.

and this divide by 9,775,282,176, the quantity annually deposited, yields 20,479 years as the time requisite for the production of the delta, instead of 67,000 years, according to the geological solution. And if to this period we add its half, for the formation of the alluvial plain, we find that instead of 100,000 years, 30,618 would be fully ample for the consummation of the work.

The next inquiry is, have the data constituting the basis of these calculations been so well established, as to demand our implicit confidence in their accuracy? Is it possible, or even probable, that they, dependent upon the vicissitudes of the weather over nearly the whole North American continent, and derived from many different water sheds, each of great extent, have happily presented their just and true averages during the limited periods of observation? This is incredible; and yet precision as to the facts, as tested, not in one year only but in many successively, is essential to any reliable accuracy in calculation. It is manifest, that if the current be greater than $1\frac{1}{2}$ mile per hour, or if a greater amount of sediment than $\frac{1}{3000}$ part be suspended in the water, or if both together should be increased, much less time would be required for the accumulation of the deposits at the river's mouth. In a note to the calculation submitted by the geologist, it is stated, that since the year 1846, Dr. Riddell has repeated his experiments, without any material variation in the results; although Messrs. Andrew Brown and M. W. Dickeson, in their report to the American Association for Advancement of Science, Philadelphia, 1848, estimate the mean annual discharge of water by the

Mississippi as nearly *one third* more than Dr. Riddell's, and the solid matter held in suspension as 1 to 528, instead of 1 to 3000.

If these amounts were used as a basis of calculation, the time required for the formation of the delta would be reduced to 2703 years; and the delta and plain together would only demand a period of 4060 years, instead of 100,000 as the geologist has asserted.

From the conflicting estimates of these different parties, and of others to which it is unnecessary to refer, it is very evident that this mode of establishing the age of the earth possesses no features that can command respect. All such speculations are vain and idle, and are really too vague and indeterminate to find a place in works of solid learning. To suppose that what a river is doing to-day it actually did 100,000 years ago, is an assumption at variance with man's limited experience, and contrary to the dictates of genuine science. Rivers continually labor to enlarge their passages, by dredging the bottoms and wearing away the banks that confine them; and as this enlargement progresses, with an even pace do their velocities diminish, and their abrading and transporting powers become reduced. At the outset, as every one is aware who has ever attempted to divert a water course into a new channel, the excavation of the bottom and banks is very great, and, perhaps, greater in the first year than in any ten afterwards. When an equilibrium has been established between the consistency of the bottom and banks, on the one hand, and the speed and force of the water on the other, no observations then made could be accept-

ed as the measure of its operations when at a former day it was more actively engaged in excavating and transporting material. As time advances, continual changes in these relations occur, so that the tests of any one age are inapplicable to another. Again, the proportions of sediment ascertained to exist in water near the surface cannot be taken as the standard for the whole volume of a river. All the material transported by a stream is, by impact or friction, abraded from the bottom and side banks, over and within which its current flows. From the bottom of the Mississippi, by far the largest portion of its sediment must be derived, as its width is 2,640 feet for a distance of 2,000 miles, whilst its two sides together, at most, only present a perpendicular surface of 320 feet to the action of the water. The friction that wears away the bottom is increased with the depth, and if the Mississippi be 160 feet deep, it must be 160 times as great upon its bed as that which cuts away the banks along the surface of the stream. The glacier, with its slow creeping motion, scores and polishes the hardest rocks. This it does by friction, not because it consists of ice, but because it is heavy. Water is heavier than ice, and it can readily be conceived, how very great must be the material ground up at the bottom, and borne along by the Mississippi to its mouth, which never appears at the surface, and cannot, therefore, be included in any of the tests hitherto made. The quantity of matter suspended in the water in the form of small particles, and rolled along its bottom in larger lumps, must evidently be much greater at present than has been estimated, and must be less now than

in former years, when the material was softer and the velocity greater. The delta has not detained, and does not now represent, the full value of the sediment transported by the river in former ages, for the Gulf stream current, flowing with the high velocity of five miles an hour, has swept most of it away, and distributed it over the bed of the Gulf and the bottom of the Atlantic, certainly as far as Newfoundland, and perhaps to the shores of Norway.

With all these and other very important considerations omitted, it is clear that the calculations as to the earth's antiquity, made in so loose a way, and based upon such indeterminate data, are no better than idle guesses, not entitled to any weight whatever, in questions of serious moment.

But again, the Niagara Falls is adduced, as a sure witness to establish the falsity of common chronology, and to secure for geological speculations a greater degree of reliance. The mathematical science is invoked to extract from its noisy tongue the confession, that for 35,000 years past it has unceasingly labored to eat away the rocks that have restrained its bounding waters. Whether it makes such a confession or not, is worthy of inquiry. In the language of the father of this thought, "The physical appearance of the country suggests that the Niagara once flowed in a shallow valley, across the whole platform, from the present site of the Falls to the escarpment called the Queenstown Heights, where it is supposed that the cataract was first situated, and that the river has been slowly eating its way backward through the rocks for the distance of seven miles." The geologist visiting the spot, and

in person carefully examining the subject, affirms, that during the last century, one foot per year may be deemed the most probable rate at which the Falls have receded; and, assuming that as correct, avers that "it would have required 35,000 years for the retreat of the Falls from the escarpment of Queenstown to their present site."

Accompanying this estimate, he furnishes the following statement:

"At its present site, with a perpendicular fall of 165 feet, the river is divided into two sheets of water by an island, the largest cataract being more than a third of a mile broad—1,760 feet—the smaller one having a breadth of 600 feet. When the water has precipitated itself into an unfathomable pool, it rushes with great velocity down the sloping bottom of a narrow chasm for a distance of seven miles. This ravine varies from 200 to 400 yards in width from cliff to cliff, contrasting, therefore, strongly in its breadth, with that of the river above. Its depth is from 200 to 300 feet, and it intersects, for about seven miles, the tableland before described, which terminates suddenly at Queenstown, in an escarpment, or long line of inland cliff, facing northward towards Lake Ontario."

With these facts and conjectures, formed and collated by himself, our author, ignoring the plainest laws of common arithmetic, affirms that thirty-five thousand years would be requisite for the recession of the Falls from Queenstown to their present position. This period of time is no more the legitimate answer to his own problem than thirty-five millions would be. He has merely taken the wrong rule for its solution—"The Rule of Three Direct," instead of the rule of "Inverse Proportion." At the present site, the river is described as divided by an island into two branches, pouring over dams, which together

form a width of 2,360 feet, and one foot of which is annually worn or carried away. But below the Falls, and thence down to Queenstown, the ravine, or ancient channel, is stated as varying in width from 200 to 400 yards, and one foot is still assumed as the measure of recession in this narrow portion of the route. But this is clearly erroneous; for if the water, spread in a thin sheet over a dam 2,360 feet wide, can cut away one foot per annum, it would certainly accomplish much more, when concentrated in a solid body upon a dam only 900 feet in width. The tyro would say to this, that 2⅔ feet would be much nearer the truth, and that, if all the features remained uniform throughout the entire seven miles, instead of 35,000 years only 13,860 would be required for its excavation.

But this period can only be deduced upon the assumption that one foot per annum has been the measure of recession. Upon what ground that is based, will appear from the following statement furnished by the geologist himself:

"As this part of the country was a wilderness till near the end of the last century, we can obtain no accurate data for estimating the exact rate at which the cataract has been receding. Mr. Bakewell, son of the eminent geologist of that name, who visited the Niagara in 1829, made the first attempt to calculate, from the observations of one who had lived forty years at the Falls, and who had been the first settler there, that the cataract had during that time gone back about *a yard annually*. But after the most careful inquiries which I was able to make during my visit to the spot in 1841-2, I came to the conclusion that the average of *one foot* a year would be a much more probable conjecture."

In this curt and summary way does our geologist attempt to dispose of the estimate of Mr. Bakewell, based upon the forty years' observation of one who remained permanently on the spot, and in its place substitute his own probable conjecture, adopted during a brief and fleeting visit. No reason whatever is assigned why the more rapid rate of the former should be rejected, neither is any given why the slower pace of the latter should be adopted as the more correct. The decision is left to rest upon his own bare opinion, which, if not formed with more care and accuracy than the accompanying mathematical inferences, cannot be deemed as very reliable, and certainly not infallible. If he, in 1841, enjoyed superior advantages for determining the rate of recession, which Mr. Bakewell, in 1829, did not possess, proper respect for the latter, for the reader, and the subject, would suggest that they should be communicated.

If Mr. Bakewell's estimate of one yard be taken as the standard of Niagara's retreat from Queenstown, the whole time required for its retrocession to its present position will be only one third of that before deduced by the slower rate; and instead of 13,860 years, a proper solution of the problem yields only 4,620 years as the period necessary for the excavation; one that nearly corresponds with the lapse of time since the Flood, according to the commonly received chronology.

But whether a foot or a yard be taken as the annual rate of waste at the present site of the Falls, it can by no means be assumed as the uniform rate that has prevailed in past time throughout the whole

seven miles below. The cataract now pours over a hard compact limestone, durable in its nature, and nowhere in the ravine below does any material occur *harder* or *more indestructible;* but very much of it is softer and would require less time for its removal. Beneath the uppermost layer of compact limestone, which is ninety feet thick, are found beds of soft shales, equally thick, which disintegrate and crumble away under the combined action of the frost and the percussion of the spray that bounds from the falling waters. In consequence of this undermining process, portions of the upper limestone overhang at times as much as forty feet, and, being unsupported, huge masses, as in the years 1818 and 1828, tumble down with all the violence of an earthquake. It is in this way that the cataract has chiefly receded, and the geologist, when assuming a uniform rate for the retrocession, being well aware of its inadmissibility, endeavors in another way to obviate the objection. He says that

"An examination of the geological structure of the district, as laid open in the ravine, shows that at every step in the process of excavation, the height of the precipice, the hardness of the material at its base, and the quantity of fallen matter to be removed, must have varied. At some points it may have receded much faster than at present, but in general its progress was probably slower, because the cataract, when it began to recede, must have had nearly twice its present height."

In this statement, it is admitted that the rate could never have been uniform, and at some points it was greater than that assumed; but when it is argued that because of an increase of height, its progress of

excavation would be slower, the author commits an egregious blunder. True, when the height was doubled, there would be twice the amount of material to be removed, but then, also, when partially undermined by the frost and spray, there would be twice the weight in the shelving, unsupported rock, to cause it the sooner to tumble down; and the water itself, falling from twice the height, would have its destructive and undermining powers not simply doubled but quadrupled—its impact being as the square of the height—and, therefore, it would accomplish this double work in half the time. Instead of being "probably slower," it was certainly much faster in this part of its operations, and consequently no portion of the ravine would demand a lower rate than that exhibited at the present site.

Viewed, then, in any light, the Niagara Falls and its surroundings fail to furnish the slightest warrant for believing that the grand cataract is a single day older than Noah's Flood. Such is the value of geological mathematics.

PART THIRD.

"What does not fade? * * * *
Time shakes the stable tyranny of thrones,
And tottering empires rush by their own weight.
This huge rotundity we tread grows old,
And all these worlds that roll around the sun,
The sun himself shall die, and ancient night
Again involve the desolate abyss."—ARMSTRONG

SOLOMON says that God made man upright, but he has sought out many inventions—deriving the idea probably from his patent office. It was by accident discovered that sand and soda, two common earths, each perfectly opaque, when fused together would form another and transparent body known as glass. Man, seeking his inventions, seizes these opaque elements; with heat combines them; procures his glass, grinds it into convex forms, and calls them lenses. These next are arranged in tubes, and then turned upon the heavens. With the aid of this simple invention, the natural eye of man is enabled to penetrate the distant realms of space, and there perceive the All-creative hand still engaged in making worlds.

The nearer planets, too, to him unfold new and unimagined wonders; that some are begirt with rings and others blessed with the silvery light of divers moons. These, to him, become so familiar, that he can tell exactly to the hour and the minute when one little moon shall be eclipsed by its sister, and when the light of either one or both shall be obscured by the mother planet. And in this particular he is not confined to time that is present, but is equally as sure and certain of the happening of these events at a distant day, a thousand years or more, as if now actually occurring within his sight. All this is marvelous and wonderful!—but all resulting from man's inventions!

It was the Lord who gave to opaque sand and soda the faculty of becoming transparent glass. It was He who gave to convex glass the power of converging the rays of light, and who gave to light the quality of being so concentrated as to bring distant objects into closer view. It was also the Lord that made the eye of man, and adapted it to discern the objects in distant space and observe the motions there occurring. It was He who did it all, according to His own good will and pleasure. And also, it was the self-same Almighty Being who, in the olden time, imparted to the moral eye of a chosen few the faculty of piercing the veil of future time, and foreseeing the things that then must come to pass. This he did without the factitious aid of sand or soda; and this He might well do, as he made them all, and gave to each its peculiar character. Now, it is no more wonderful that He should empower an ancient prophet to read the things of *distant time*, than that He should

enable the modern astronomer to view the things of *distant space* and *time*. Nor is it more wonderful that Isaiah should be permitted to behold the future facts that pertain to the earth he lived upon, than for Herschel to foresee and tell the future facts that pertain to other and distant worlds. The one perceives remote realities by the aid of sand and soda—the gifts of God; the other achieves the same by natural gifts to him at once imparted.

What the astronomer reveals is beyond the natural range and scope of sight and mind. None could have imagined the existence of those distant orbs and motions before they were discovered, and even their verity now depends upon the single sense of sight alone. What the prophet foretells may be measured and tested by what we daily see and know. Prophecy may be subjected to the crucible of unerring truth, and tried by the laws of nature—those physical laws that rule the earth and all its parts with invariable precision and steadiness—

> "That very law which moulds a tear,
> And bids it trickle from its source—
> That law preserves the earth a sphere,
> And guides the planets in their course."

If the seer announces that the mountains shall fall, who can doubt the fact? Had he said that they shall stand perpetually and forever, then faith might have wavered, yea, well refused the statement.

All nature's labors are to secure an exact equilibrium; all the elements strive to find their proper level. Agitate the water in the basin and it soon comes to rest; disturb the waters of the ocean, and

raise its waves to mountain's height, each and every drop, even the smallest particle, will find its place in the sphere, when the disturbing power is stilled. The winds of heaven when overheated lose their equiponderance, and thus are "whirled about continually, only to return again according to their circuits." Take the pebble, or even a grain of sand, from the mountain top, where it has quietly reposed for centuries, and hurl it into space, and rapidly does it rush to the humble plains below. Rocks, hills, plateaus and Alpine heights, are all, equally with water, solicited and incited to seek a common level. Then why do they stand? Why maintain their lofty heads so far above the clouds, if it be contrary to their natural inclinations?

These irregular elevations, as we have seen, were upheaved to their present heights by the liquid lava within the earth, itself endeavoring to escape the more oppressive burden of a subsiding world. The force, then, exerted beneath each hill and plain, plateau and mountain chain, was exactly equal to the respective weights and resistances of the several masses thus upthrown. Not a pound more, or they would have been higher; not an ounce less, or they would not have been upraised so high. This power, thus exerted, must be nicely balanced with its supported weights. The force upholding is truly equal to the weight of the matter upheld, for there is no such thing as surplus or idle power in nature; the whole is busily engaged fulfilling its duty. To this effect and upon this subject does the prophet Isaiah speak intelligibly:

"Who hath *measured the waters* in the hollow of his hand, and meted out heaven with the span, and comprehendeth *the dust of the earth in a measure*, and *weighed* the *mountains in scales*, and the *hills in a balance*."

Again, in the Apocalyptic vision of St. John are we presented with a scene that simply and most beautifully illustrates the delicacy of the balances that exist in the earth's shelly crust. Angels, we are taught, are but ethereal immaterialities, totally destitute of weight; yet light as they are, one is depicted in the closing scene of time as standing with one foot upon the sea, and with the other upon the land, mashing down the crust of our globe and sinking all its broken fragments into the seething gulf below. An angel's weight is thus shown to be all-sufficient to disturb and destroy the perfect equilibrium that nature makes. But disturb the adjustment that now exists, destroy the simple balances that now prevail, then the law of forces, the depressing power of gravity, must bring the proud and lofty mountains down to a level with the plain.

If we consider what gigantic masses of mineral, earth and rock, are thrust above and upheld beyond their normal limits, and only contemplate how inconceivably great must be the weight of such stupendous masses that are thus resting upon the interior fluid—itself compressed and retained in its unnatural position only by other resisting surfaces of this earth's crust, we shall be astonished that nature has so long been bound with fetters, and that these uplifted prisoners have not long since exerted their giant strength and set themselves at liberty. Can we doubt that

these elevations must ultimately fall—that time will corrode the stubborn masses and adjust the differences now existing, and restore a natural and continually demanded equipoise to all the parts alike?

To some it may occur that mountains and plateaus are not supported by the liquid lava within the earth; but that in whole or part their sloping sides are sustained by the rocky abutments of the adjoining plains. Such conceptions are, however, clearly untenable, and bring to mind the learned dogmas of that ancient sect who insisted that the earth was a broad and extended table, and, for a support, rested upon a pillar; and that the pillar itself extended downward entirely to the bottom. Others, with equal consistency and firmness, whilst admitting the table and the pillar, and that the latter could not be endless, strenuously insisted that it rested upon a terrapin. Thus it would be with mountains resting upon their flanking plains; what would the flanks repose upon, if not the central fluid? But mountain slopes, and flanks, and bases, are only aggregated earths, and like all earthly things are perishable; they moulder and crumble into atoms, lose their cohesive power, and return again to dust; and long have they been enduring their superincumbent weights, whilst time has been busy gnawing them to the quick.

But suppose the present adjustment by any sudden convulsions to become altered and disturbed; that the Pacific shoal, the shattered crest of the ancient dome, shall fail and fall; or that the earth from pole to pole, with all its mountains, hills and plains, from any other cause be violently shaken, and made to reel and rock; what then? It requires no great depth

of learning, no knowledge of abstruse science, to render an answer to the question. The interior liquid lake, now compressed and forcibly retained out of its natural shape, would seize that opportunity to resume its primitive spherical form, and become again, as at first, a properly balanced globe. Its waves would take that direction which offered to them the least resistance. When the ancient Adamland, accursed, trembled at the presence of its God, and to conceal itself from His angry frown, sank beneath the waters, it did so, not all at once, but in repeated and successive stages. Each convulsive throe forced away to either side portions of the liquid lava, upon which the former world reposed. This internal fluid, thus oppressed, for a while resisted, as if to accumulate its energies, yet at length succumbed to overwhelming force. These pent up powers, expending themselves beneath the adjoining plains of the former ocean's bed, suddenly upheaved the nearest part to form the mountain, and then rolled away to raise the long and gentle slope. Throe followed throe, wave succeeded wave, each growing more and more feeble, as the impounded forces gradually found relief, until nature's efforts became exhausted; and then for a season she *stopped* to rest. She is quiescent now, reposing, waiting for her shorn locks to grow, and then, Samson like, she will drag the massive pillars down, and bring the great and small to a common level. The bluff mountain faces, and the counterslopes of minor hills, all front towards the Pacific, and there the ponderous arch beneath the waters spans the basin, and strains the abutting continents apart. Towards the Atlantic, on all the continents

the long slopes prevail, and with their gentle inclinations invite thitherward the bounding waves, to again resume their course. Thus were they going when they stopped to rest, and thus will they go again when they resume their journey.

A violent quaking and shaking of the earth, it is manifest, would destroy the present balances, produce such oscillations in the liquid lake as would liberate it from its present distorted compressions, and, in obedience to the plainest law of forces, set it rolling towards the Atlantic. The mountains, hills, plateaus, and plains, freed from their irksome constraint, throw their stupendous weight upon the moving fluid to aid it in the accomplishment of their mutual desire to rejoice once more in a spherical form, and secure for all parts their proper level. The Atlantic's bed, that withstood the expiring and exhausted waves of the Flood, can now no longer resist the combined powers, but must yield and rise, and as dry land fulfill its destiny. Such an upheaval would necessarily expel the Atlantic waters to other bounds, and so raise the ocean's height as to effectually obscure all the islands of the sea, if they successfully battled with the equalizing convulsions, and escaped subsidence. Thus would the earth become, by a single powerful effort of nature, one vast continent, a broadly extended plain, such as we found it first to have been in the Adamland. Perhaps all the mountains might not fall, some chosen humble hills might stand. Mounts Moriah and Zion, with Lebanon and the hill country of Judah, might remain as analogues of the hills and mountains in Noah's day. For such a fate the Atlantic is now preparing; now

busy with its currents, its grasses and its finny tenants, in arranging its soil in fertile layers for the coming day. Timber is continuously buried in its valleys for future coal, and the polar iceberg is planting its stony memorials over its surface, to testify to future man its former state.

Thus, by the exact laws of nature and nature's God, does it clearly appear that the mountains may easily be made to topple from their exalted positions, and sink into the plains; and equally apparent is it, by the very same laws, what would be the manner of that fall, and its effect upon the crust of the earth we live upon. As the prophets have referred to this subject in unambiguous terms, and may therefore be tested by these unerring laws, herein have they the advantage over the astronomer, and herein again, if correct, are they the more entitled to our credence. Yet the fact is undeniable, that man is ever incredulous as to things near by, whilst to those most distant he readily yields his faith. When Christ himself in person came upon earth, fulfilling every prophecy and manifesting the august powers of Deity, He found it necessary to rebuke the chosen people for their incredulity, and said: "Ye can discern *the face of the sky*, but cannot discern the *signs of the times*." Knowing man's nature too, he in advance informs us that at his second coming, he will be received in the same way; and that none will believe it; "Nevertheless, when the Son of Man cometh, shall He find faith on the earth?"—Luke ch. 18 : 8.

The things revealed, then, in Scripture, are certainly entitled to our consideration, and as the facts foretold are within our comprehension, we may safely turn

"to the law and to the testimony, for if they speak not according to this word, it is because there is no light in them."—Isaiah ch. 8 : 20.

"We have also a *more sure word* of prophecy; whereunto ye do well that ye take heed, as unto a light that shineth in a dark place, until the day dawn and the day star arise in your hearts. Knowing this first, that no prophecy of the scripture is of any private interpretation. For the prophecy came not in old time by the will of man; but holy men of God, spake as they were moved by the Holy Ghost."—2 Pet. ch. 1 : 19.

Does one doubt the truth of prophecy, he need but read the *history* of Babylon, Nineveh, Tyre, and Sidon, as previously written upon the prophet's page; or turn his eye to Egypt, and see her now fulfilling her predicted fate. Shall one doubt the truth of prophecy, "then He that hath an ear, let him hear what the Spirit saith unto the Churches." If still he doubt, let him look upon the sons of Israel, wandering amidst the nations of all the earth, a people without a home, literally fulfilling the prophecy of Moses in the wilderness, recorded before they even became a nation. If still he doubt, he is beyond hope and light; for "if he believe not Moses and the prophets, neither would he believe, though one rise from the dead."

In reading prophecy it should be constantly borne in mind, that the great and notable day of the Lord does not mean the brief space of twenty four hours, which man has established, but a long and protracted period, comprising years; and furthermore, that this Lord's day is divided into shorter periods, the eventful scenes of which are successively presented to

our minds, in different stages of their progression. Preconceived and settled notions will often thrust themselves before us, when we least expect it, and by their influence, often unnoticed, mislead and mystify matters otherwise plain. We should therefore most carefully divest ourselves of those established ideas, grounded upon daily habits and experiences, the more freely to comprehend an order of things which are entirely new, because unfamiliar.

Those who spoke of old, as they were moved by the Holy Ghost, to enable them more vividly to perceive and intelligibly describe the matters they were to announce, were permitted to behold in advance, as present with and before them, the actual occurrences of the future. No event is oftener referred to in the scriptures than the second coming of Christ, and none is detailed with more fullness and precision. If some only of the many passages descriptive of that event are brought together and examined side by side, they unfold a systematic series of truths refreshing to the mind, and strengthening to the faith. Not only is the second advent repeatedly affirmed, but the most extraordinary physical changes, as preparatory to the coming of the Great King, are minutely described, together with the effect of such changes upon the earth itself and all things on it endowed with life. The causes and the consequences, the principals and their incidentals, are painted so plainly and vividly, and so conformably to the ways of nature, that all may understand.

As indicating the preparation for the coming of the Messiah, we cite a few passages:

"Fear and the pit and the snare are upon thee,

Oh inhabitants of the earth; and it shall come to pass, that he who fleeth from the noise of the fear shall fall into the pit; and he that cometh up out of the midst of the pit shall be taken in the snare; for the windows from on high are open, and *the foundations of the earth do shake.*

"The earth is utterly broken down, the earth is clean dissolved, the earth is moved exceedingly.

"The earth shall reel to and fro like a drunkard, and shall be removed like a cottage; and the transgression thereof shall be heavy upon it, and *it shall fall* and not rise again."—Isaiah, ch. 24: 17.

"Behold I will make thee a new, sharp, threshing instrument, having teeth; thou shalt thresh the *mountains* and beat them small, and shalt make the hills as chaff.

"Thou shalt fan them and the wind shall carry them away, and the whirlwind shall scatter them; and thou shalt rejoice in the Lord, and shalt glory in the Holy One of Israel."—Isaiah, ch. 41: 15.

"For the *day of the Lord* of hosts shall be upon every one that is proud and lofty, and upon every one that is lifted up; and he shall be brought low;

"And upon all the cedars of Lebanon, that are *high* and *lifted* up, and upon all the oaks of Bashan;

"And upon all the *high mountains* and upon all the hills that are lifted up;

"And upon every high tower and upon every fenced wall;

"And upon all the ships of Tarshish, and upon all the pleasant pictures.

"And the loftiness of man shall be bowed down, and the haughtiness of men shall be made low; and the Lord alone shall be exalted in that day.

"And the idols he shall utterly abolish,

"And they shall go into the holes of the rocks, and into the caves of the earth, for fear of the Lord, and for the glory of his Majesty, *when he ariseth* to *shake terribly* the earth.

"In that day a man shall cast his idols of silver, and his idols of gold, which they made each one for himself to worship, to the moles and to the bats;

"To go into the clefts of the rocks and into the tops of the ragged rocks, for fear of the Lord and for the glory of his majesty, when he ariseth to shake terribly the earth."—Isaiah, ch. 2: 12–21.

"I will make waste mountains and hills, and dry up all their herbs."—Isaiah, ch. 42: 15.

"For this is as *the waters of Noah* unto me; for as I have sworn that the waters of Noah should no more go over the earth; so have I sworn, that I would not be wroth with thee nor rebuke thee.

"For the mountains shall depart and the hills be removed, but my kindness shall not depart from thee."—Isaiah, ch. 54: 9.

"For in my jealousy and in the fire of my wrath, have I spoken. Surely in *that day* there shall be a great shaking in the land of Israel;

"So that the fishes of the sea, and the fowls of the heaven, and the beasts of the field, and all creeping things that creep upon the earth, shall shake at my presence, and the mountains shall be thrown down, and the steep places shall fall, and every wall shall fall to the ground."—Ezek. ch. 38: 19.

"The Lord shall roar out of Zion and utter his voice from Jerusalem, and the heavens and the earth shall shake."—Joel, ch. 3: 16.

"He stood and measured the earth; he beheld and drove asunder the nations; and the everlasting mountains were scattered, the perpetual hills did bow; his ways are everlasting."—Hab. ch. 3: 6.

"Which removeth the mountains and they know not; which overturneth them in his anger.

"Which shaketh the earth out of her place and the pillars thereof tremble."—Job, ch. 9: 5.

"He putteth forth his hand upon the rock; he

overturneth the mountains by the roots."—Job, ch. 28: 9.

"And there were voices, and thunders, and lightnings; and there *was a great earthquake, such as was not since men were upon the earth, so mighty and so great.*

"And *every island fled away*, and the mountains were not found."—Rev. ch. 16: 18, 20.

The usual and invariable concomitants of such great convulsions of nature are also described with more force and vividness by the prophets than by our most learned geologists:

"Blow ye the trumpet in Zion, and sound an alarm in my holy mountain; let all the inhabitants of the land tremble, for the day of the Lord cometh, for it is nigh at hand;

"A day of darkness and of gloominess, a day of clouds and of thick darkness, as the morning spread upon the mountains.'—Joel, ch. 2: 2.

"The sun shall be turned into darkness and the moon into blood *before* the great and the terrible day of the Lord come.

"And it shall come to pass, that whosoever shall call on the name of the Lord shall be delivered; for in Mount Zion and in Jerusalem shall be deliverance."—Joel, ch. 2: 31.

"The great day of the Lord is near; it is near and hasteth greatly.

"That day is a day of wrath, a day of trouble and distress, a day of wastiness and desolation, a day of darkness and gloominess, a day of clouds and thick darkness."—Zeph. ch. 1: 14.

"And there shall be signs in the sun and in the moon and in the stars; and upon the earth distress of nations with perplexity; the sea and the waves roaring;

"Men's hearts failing them for fear, and for looking after those things which are coming to pass on the earth; for the powers of heaven shall be shaken.

"And then shall they see the Son of Man coming in a cloud with power and great glory.

"And when these things begin to come to pass, then look up and lift up your heads, for your redemption draweth nigh."—Luke, ch. 21: 25.

"And the kings of the earth, and the great men and the rich men, and the chief captains and the mighty men, and every bondman and every freeman, hid themselves in the dens and in the rocks of the mountains,

"And said to the mountains and rocks, Fall on us and hide us from the face of him that sitteth upon the throne and from the wrath of the Lamb:

"For the great day of his wrath is come, and who shall be able to stand."—Rev. ch. 6: 15.

No less clearly and lucidly is the effect of this terrible shaking of the earth described:

"The voice of him that crieth in the wilderness, Prepare ye the way of the Lord, make straight in the desert a highway for our God.

"Every *valley shall be exalted, and every mountain and hill shall be made low*, and the crooked shall be made straight, and the rough places plain.

"And the glory of the Lord shall be revealed, and all flesh shall see it together: for the mouth of the Lord hath spoken it."—Isa. ch. 40: 3.

"Awake! awake! put on strength, O arm of the Lord; awake, as in the *ancient days, in the generations of old;*

"Art thou not it, which hath *dried the sea*, the *waters* of the *great deep;* that hath made the *depths of the sea a way for the ransomed* to pass over?

"Therefore, the redeemed of the Lord shall return and come with singing unto Zion."—Isa. ch. 51: 9.

"And every island fled away, and the mountains were not found."—Rev. ch. 16 : 20.

"Thus saith God, the Lord, he that created the heavens and stretched them out; he that spread forth the earth and that which cometh out of it; he that giveth breath unto the people upon it, and spirit to them that walk therein;

"Behold, the *former things* are *come to pass*, and new things do I declare; before they spring forth I tell you of them."—Isa. ch. 42 : 5.

"That which hath been is now : and that which *is to be hath already been*, and God requireth that which is past."—Eccles. ch. 3 : 15.

"Is there anything whereof it may be said, See, this is new? it hath been already of old time which was before us."—Eccles. ch. 1 : 10.

Thus vividly do the prophets describe the mighty throes and changes of the physical world, that mark the *dawn* of the great and notable day of the Lord. Not only the leading feature, but its results and all its incidents, are depicted with graphic force. So mighty an earthquake, and so great, that even the very foundations of the earth do shake; the earth is moved exceedingly; the mountains, on their solid bases, quake and tremble; the earth rocks to and fro; they fall to rise no more, and the islands disappear. The humble depths of the sea, amidst the roaring of its waves, arise to make a way for the ransomed to pass over, and the earth, with all its valleys exalted to a level with its depressed hills and mountains, is now spread forth, that the "former things" may come to pass. In perfect accordance with this convulsive scene do all the minor parts appear. Be-

fore the dawn of day the elements betoken its approach. A stagnation of the air, with exhalations from the earth, produces a day of darkness and of gloominess, a day of clouds and thick darkness. The sun becomes black as sackcloth of hair; the moon becomes as blood, and the stars withdraw their shining. Nations are visited with perplexity, and men everywhere feel that it is a day of wrath, a day of trouble and distress, a day of wasteness and desolation; and they all alike, the great and small, the bond and free, invoke the rocks and mountains to fall upon and hide them. Even the fishes of the sea, the fowls of the heavens, the beasts of the field, and the insignificant things that creep upon the earth, quake and tremble at the terrific storm raging around them. The dry land is spread forth and becomes a broadly extended plain, and only Zion escapes universal humiliation to bear the honored title, "The City of the Lord, the Zion of the Holy One of Israel."—Isa. ch. 60: 14.

Thus was distinctly seen, in grand tableaux, the morning of the notable day of the Lord—a day that ends not with the first setting of the sun, but continues to its noon, with lengthened periods and stages, and only closes with the shades of eternal night. The inaugural cataclysm being ended, and the earth itself remodeled, the prophetic vision exhibits all the accessories of a world of plains. A mighty and pacific king comes to Zion, and beneath his benignant rule the sandy deserts and wildernesses put forth verdure, and are refreshed with brooks of running water. Briers and thorns cease to curse the ground, the vegetable kingdom yields all-sufficient food for man

and beast, prolongs their lives, and the carnivorous war of races is exchanged for universal peace. Babel, with its confusion, is forgotten amidst the harmonies of temper, taste and tongue, and the vice and corruption of Noah's day find their contrast in the growing, fervent zeal and adoration of all created things for their Creator. All praise the Lord for their relief from former bondage, and the happiness of their new conditions. "The dragons and all deeps, mountains and all hills; fruitful trees and all cedars; beasts and all cattle; creeping things and flying fowl; kings of the earth and all people; princes and all judges of the earth; both young men and maidens; old men and children; all praise the name of the Lord: for his name alone is excellent; his glory is above the earth and heaven."—(Psalm 148.)

"And they asked of him, saying, Lord, wilt thou at this time restore again the kingdom to Israel?

"And he said unto them, It is not for you to know the times or the seasons which the Father hath put in his own power.

"And when he had spoken, while they beheld, he was taken up; and *a cloud* received him out of their sight.

"And while they looked steadfastly toward heaven as he went up, behold two men stood by them in white apparel:

"Which also said, Ye men of Galilee, why stand ye gazing up into heaven? this same Jesus, which is taken up from you into heaven, *shall so come in like manner* as ye have seen him go into heaven."—Acts, ch. 1: 6.

"And there shall be signs in the sun and in the moon and in the stars; and upon the earth distress of nations with perplexity, and the waves roaring;

"Men's hearts failing them for fear and for looking after those things which are coming on the earth: for the powers of heaven shall be shaken,

"And *then shall they* see the Son of Man coming in *a cloud* with power and great glory."—Luke, ch. 21: 25.

"And it shall come to pass in the last days, that the mountain of the Lord's house shall be established in the top of the mountains, and shall be exalted above the hills; and all nations shall flow unto it.

"And many people shall go and say, come ye and let us go up to the mountain of the Lord, to the house of the God of Jacob; and he will teach us of his ways, and we will walk in his paths; for out of Zion shall go forth the law and the word of the Lord from Jerusalem.

"And he shall judge among the nations, and shall rebuke many people; and they shall beat their swords into plowshares and their spears into pruning hooks; nation shall not lift up sword against nation, neither shall they learn war any more."—Isaiah, ch. 2: 2.

"But they shall sit, every man under his vine and under his fig tree, and none shall make them afraid, for the mouth of the Lord of Hosts hath spoken it.

"For all people will walk every one in the name of his God, and we will walk in the name of the Lord God forever and ever.

"In that day, saith the Lord, will I assemble her that halteth, and I will gather her that is driven out, and her that I have afflicted.

"And I will make her that halted a remnant, and her that was cast far off a strong nation; and the Lord shall reign over them in Mount Zion even forever."—Micah, ch. 4: 1.

"The wilderness and the solitary place shall be glad for them, and the desert shall rejoice and blossom as the rose.

"It shall blossom abundantly and rejoice, even with joy and singing; the glory of Lebanon shall be given unto it, the excellency of Carmel and Sharon, they shall see the glory of the Lord and the excellency of our God."—Isa. 35: 1.

"I will open rivers of water in high places, and fountains in the midst of the valleys. I will make the wilderness a pool of water, and the dry land springs of water.

"I will plant in the wilderness the cedar tree, the shittah tree and the myrtle and the oil tree. I will set in the desert the fir tree and the pine and the box tree together."—Isa. ch. 41: 18.

"Remember ye not the former things, neither consider the things of old.

"Behold, I will do a new thing; now it shall spring forth; shall ye not know it? I will ever make a way in the wilderness and rivers in the desert.

"The beast of the field shall honor me, the dragon and the owls; because I give waters in the wilderness and rivers in the desert, to give drink to my people, my chosen."—Isa. ch. 43: 18.

"Then shall the lame man leap as a hart, and the tongue of the dumb sing; for in the wilderness shall waters break out and streams in the desert.

"And the parched ground shall become a pool, and the thirsty land springs of water; in the habitation of dragons, where each lay, shall be grass with seeds and rushes.

"And an highway shall be there, and a way, and it shall be called The way of holiness; the unclean shall not pass over it, but it shall be for those; the wayfaring men though fools shall not err therein."—Isa. ch. 35: Zech. ch. 8: 11.

"Instead of the thorn shall come up the fir tree, and instead of the brier shall come up the myrtle tree."—Isa. ch. 55: 13.

"Hallowed be thy name, thy kingdom come; Thy will be done on earth as it is in Heaven." Matt. ch. 6: 9.

"Then will I turn unto the people, a *pure language*, that they may all call upon the name of the Lord, to serve him with *one consent*." Zeph. ch. 3: 9.

"Thou shalt not see a fierce people; a people of a deeper speech, than thou canst perceive; of a stammering tongue that thou canst not understand." Isa. ch. 33: 19.

"And the Lord shall be King over all the earth; in that day shall there be *one* Lord, and His name one." Zech. ch. 14: 9.

"For the earth shall be filled with the knowledge of the glory of the Lord, as the the waters cover the sea." Habak, ch. 2: 14.

"Thus saith the Lord. As the new wine is found in the cluster, and one saith, Destroy it not, for a blessing is in it; So will I do for my servants sake, that I may not destroy them all.

"And I will bring forth a seed out of Jacob and out of Judah, an inheritor of my mountains, and mine elect shall inherit it and my servants shall dwell there.

"And Sharon shall be a fold of flocks, and the valley of Achor a place for the herds to lie down in, for my people that have sought me.

"And in this mountain shall the Lord of Hosts, make unto all people, a feast of fat things, a feast of wines on the lees; of fat things full of marrow, of wines on the lees well refined.

"And he will destroy in this mountain, the face of the covering cast over all people, and the vail that is spread over all nations. He will swallow up death in victory; and the Lord God will wipe away tears from all faces; and the rebuke of his people, shall he take away from all the earth; for the Lord hath spoken it." Isa. ch. 24: 6.

"Then shall not hunger nor thirst, neither shall the heat nor sun smite thee; for he that hath mercy on them shall lead them, even by the springs of water shall he guide them.

"And I will make all my mountains a way, and my highways shall be exalted.

"Behold, these shall come from far; and lo, these from the north and from the west; and these from the land of Sinim.

"Sing, O Heavens, and be joyful, O earth, and break forth into singing, O mountains; for the Lord hath comforted his people, and will have mercy upon his afflicted."—Isa. ch. 49 : 10.

"Behold, thou shalt call a nation, that thou knowest not, and nations that knew not thee shall run unto thee, because of the Lord the God, and for the Holy One of Israel; for he hath glorified thee."—Isa. ch. 55 : 5.

"So shall they fear the name of the Lord from the west, and his glory from the rising of the sun."—Isa. ch. 59 : 19.

"And the Gentiles shall come to thy light, and kings to the brightness of thy rising.

"Lift up thine eyes round about and see; all they gather themselves together, they come to thee : thy sons shall come from far, and thy daughters be nursed at thy side.

"Then thou shalt see and flow together, and thine heart shall fear and be enlarged; because the abundance of the sea shall be converted unto thee, the forces of the Gentiles shall come unto thee;

"And the sons of strangers shall build up thy walls, and their kings shall minister unto thee.

"The sons also of them that afflicted thee shall come bending unto thee; and all they that despised thee shall bow themselves down at the soles of thy feet; and they shall call thee the city of the Lord, the Zion of the Holy One of Israel."—Isa. ch. 60 : 3–14.

"In those days it shall come to pass, that ten men

shall take hold out of all languages of the nations, even shall take hold, of the skirt of him that is a Jew, saying, We will go with you: for we have heard God is with you."—Zech. ch. 8: 23.

"Thus saith the Lord God, Behold, I will lift up mine hand to the Gentiles, and set up my standard to the people; and they shall bring thy sons in their arms, and thy daughters shall be carried upon their shoulders:

"And kings shall be thy nursing fathers, and their queens thy nursing mothers: they shall bow down, with their face toward the earth, and lick up the dust of thy feet, and thou shalt know that I am the Lord: for they shall not be ashamed that wait for me."—Isa. ch. 49: 22.

"For I reckon that the sufferings of this present time are not worthy to be compared with the glory which shall be revealed in us.

"For the earnest expectation of the creature waiteth for the manifestation of the sons of God.

"For the creature was made subject to vanity, not willingly, but by reason of him who hath subjected the same in hope;

"Because the creature itself also shall be delivered from the bondage of corruption into the glorious liberty of the sons of God;

"For we know, that the whole creation groaneth and travaileth in pain together until now;

"And not only they, but ourselves also, which have the first fruits of the spirit; even we ourselves groan within ourselves, waiting for the adoption, to wit, the redemption of our body."—Romans ch. 8: 18.

"The voice said, Cry, and he said, What shall I cry? All flesh is grass, and all the goodliness thereof is as the flower of the field; surely the people is grass."—Isa. ch. 40: 6.

"And there shall come forth a rod out of the stem of Jesse, and a branch shall grow out of his roots;

"And the spirit of the Lord shall rest upon him, the spirit of wisdom and understanding, the spirit of counsel and might, the spirit of knowledge and of the fear of the Lord;

"And righteousness shall be the girdle of his loins, and faithfulness the girdle of his reins.

"The wolf also shall dwell with the lamb; the leopard shall lie down with the kid; and the calf and the young lion and the fatling together, and a little child shall lead them;

"And the cow and the bear shall feed; their young ones shall lie down together; and the lion shall eat straw like an ox;

"And the suckling child shall play on the hole of the asp, and the weaned child shall put his hand on the cockatrice's den.

"They shall not hurt nor destroy in all my holy mountain: for the earth shall be full of the knowledge of the Lord, as the waters cover the sea."—Isa. ch. 11: 1.

"Thus saith the Lord of Hosts; There shall yet old men and old women dwell in the streets of Jerusalem, and every man with his staff in his hand for very age.

"And the streets of the city shall be full of boys and girls playing in the streets thereof;

"For the seed shall be prosperous: the vine shall give her fruit, and the ground shall give her increase, and the heavens shall give their dew; and I will cause the remnant of this people to possess all these things."—Zech. ch. 8: 4–12.

"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.

"There shall be no more thence, an infant of *days*, nor an old man that hath not filled his days; for the child shall die an hundred *years* old; but the sinner, being an hundred years old, shall be accursed.

"And they shall build houses and inhabit them,

and they shall plant vineyards and eat the fruit 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 labor 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 the dust shall be the serpent's meat. They shall not hurt nor destroy in all my holy mountain, saith the Lord."—Isa. ch. 65: 18.

"And I saw thrones, and they sat upon them, and judgment was given unto them; and I saw the souls of them that were beheaded for the witness of Jesus, and for the word of God, and which had not worshiped the beast, neither his image, neither had received his mark upon their foreheads or in their hands; and they lived and reigned with Christ a thousand years."—Rev. ch. 20: 4.

"For as in Adam all die, even so in Christ shall all be made alive;

"But every man in his own *order;* Christ the *first fruits*,

"*Afterwards they* that are Christ's, *at his coming.*

"Then cometh the end, *when* he shall have delivered up the *kingdom* to God, even the Father; *when* he shall have put down all rule and authority and power.

"For he *must reign* till he hath put all enemies under his feet."

"The *last enemy*, that shall be destroyed is *death.*" 1 Cor. ch. 15: 51.

"And so it is written, the first man Adam was

made a living soul, the last Adam was made a quickening spirit.

"The first man is of the earth, earthy, the second man is the Lord of heaven.

"And as we have borne the image of the earthy, we shall also bear the image of the heavenly."—1 Cor. ch. 15 : 45.

With these few scenes, collated from the multitude in scripture, illustrating the coming of the Lord, we cannot fail to recognize that "former things are come to pass," and that "which hath been already of old time" now returns before us. Thus is unfolded the day of the restitution of all things; the day of the regeneration, or new Genesis, in which to this second Adamland comes the second Adam, to head the human family, and with his "quickening spirit" impart that perpetual youth and purity to the "living soul," which the first Adam forfeited by his transgression. This tortuous and diversified earth, with all its antagonistic influences, is exchanged for a land of concurrent harmonies, and the vail spread over all nations is thus at once removed. All the elements cease their jarring discord, and cordially unite to promote unity, amity and fraternal love. Childhood sports through a century, and though the years of the man be as the days of the tree, yet he long enjoys the work of his hands, and his sight remains undimmed with age. Each under his own vine and fig tree, with none to make him afraid, dwells in satisfied content, unmarred by pain or tear. No unintelligible speech is spoken, not even a stammering tongue is heard, but a pure language prevails, and the Lord's name is one and the same throughout the earth. Swords are turned to ploughshares, and the science

of war is utterly forgotten, even among the beasts and creeping things of earth. The rich dew of Hermon now universally diffuses fertility, so that even the parched deserts rejoice in flags and rushes, for the happy homes of thirsty dragons and saurians. And thus doth "every thing that hath breath praise the Lord."

How simply, fully and graphically have the prophets of old "made known unto us the mystery of His will, which according to His good pleasure, from the foundation of the world, He hath purposed in Himself. This they could not have done, had not "the eyes of their understanding been enlightened," and their minds enlarged, "by the spirit of wisdom and revelation." The physical changes essential and preparatory to the second coming, they could not have conceived, unless *in vision* they had first discerned the exact equipoises that exist in the different parts of nature, as indicated by the Great Architect, in measuring the waters in the hollow of his hand, assessing the value of the atmosphere, by meting its height with his span, computing the weights of the plains in measures, of the hills in balances, and of the mountains in scales, and in his final estimate counting the nations but as a drop in the bucket, or only as the small dust that settled upon his scales. Neither would they have known, that to change this rugged world of ours into a land of plains, to convert discord into harmony, feud and strife into brotherly love, a terrible shaking of the earth was the great physical requisite. Yet so have they described it, lucidly and consistently in all its parts and features; with powers most mighty, with effects

prodigious, yet each so naturally and obviously commensurate with the other, that all may understand; even the wayfaring man may not fail to perceive their concordant adequacy and aptness. A great earthquake, such as was not since men were upon the earth, so mighty and so great, occurs, and the earth throughout is shaken terribly; the islands all flee away and amidst the roaring of the waves a highway emerges from the deep. The earthy fabric reels to and fro, walls and towers tumble down, the valleys are lifted up, the great hills lower their heads, spread out and flatten, and the entangling fetters that bind the mountains to their places are forcibly sundered, and then—

"Precipitate the pond'rous mass descends.
From steep to steep the rolling ruin bounds;
At every shock, the crackling mount resounds;
Still gathering force, it smokes, and urged amain,
Whirls, leaps and thunders down, impetuous to the plain;
There stops." HOMER.

In this age of light and knowledge, all may readily discern in the prophetic page, the simplicity of the manner and the sublimity of its execution, the all-sufficiency of the cause, and the certain sequence of the effect; and that these, in the due course of nature, may and must fulfill the visions in their appointed times. And thus is the prophet not only tried, but vindicated and sustained, by the plainest teachings of man's philosophy.

Some would have us believe that these prophetic views do not refer to this earth, but are simply metaphors, descriptive of kings and nations, their rise and fall, their conflicts, or else to another world to come.

Yet they are unmindful of the scenes depicted, and forgetful that all the predictions written by the same hand, upon the same page, as to things now past, have been fulfilled to the letter, without the help of metaphor. They are also oblivious as to what and how much and little we are told relating to the great hereafter. True it is, that peoples, nations and empires are included in the prophetic visions, but they, as such, are expressly referred to, and they respond, often in name, not to the metaphor, but to the explicit letter of their predicted fate. Yet, in the end, all will bow in humiliation when the great earthquake comes, as then the days of the Gentiles will be fulfilled, and the sceptre pass from Japhet's bloody hand to the pacific and blissful grasp of Shem.

That last long day of earth is to be a "day of rest," into which many will not enter, because of their unbelief. Then "the *whole earth* is at rest, and is quiet; they break forth into singing."—Isaiah, ch. 14: 7.

And his rest shall be glorious: "And Jacob shall return and shall be in rest, and be quiet, and none shall make him afraid."—Jere. ch. 30: 10.

The first beams of the morning of this glorious day of rest will be seen in the east, when he "who hath planted the tabernacles of his palace between the seas, in the glorious holy mountain, shall come to an end without any to help him (Dan. ch. 11: 45) —and the day itself will only end, when death and hell are cast into the lake of fire. Ages will intervene between its dawn and dusk, and the earth itself will feel the infirmities of its years. Its very substance is finite and perishable, as we know full well,

and as all the animated forms that are composed of its elements most emphatically teach. "What decayeth and waxeth old is ready to vanish away." (Heb. ch. 8: 13.) The world languisheth, and fadeth away, (Isaiah, ch. 24: 4;) "is waxing old as a garment," so that its parts will not hang together. Since the creation, she has well and fully discharged her duties; and successively has she presented all the parts of her rotund form for the home and sustenance of her numerous offspring, and now she has no more to offer. In her efforts to accommodate her children, her stony body has become so worn and rent, that it will not endure another subsidence and upheaval. Any unusual force or power may destroy its equilibrium, rend the feeble ligaments that tie its shivered parts together, and plunge all the dissevered fragments into the fiery gulf below. And so will it be "in the day of the voice of the seventh angel, when he shall begin to sound, the mystery of God is finished, as he hath declared to his servants, the prophets, that there shall be *time no longer*." Rev. ch. 10: 6.

"For behold the day cometh, that shall burn as an oven; and all the proud, yea, and all that do wickedly, shall be stubble; and the day that cometh shall burn them up, saith the Lord of Hosts, that it shall leave them neither root nor branch."—Malachi, ch. 4: 1.

"The heavens and the earth, *which are now*, by the same word are kept in store, reserved unto fire, against the day of judgment and perdition of ungodly men. But, beloved, be not ignorant of this one thing, that one day is with the Lord as a thousand years, and a thousand years as one day. But the

day of the Lord will come as a thief in the night, 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 therein shall be burned up."—2 Peter.

"And the devil that deceived them was cast into the lake of fire and brimstone, where the beast and false prophet are, and shall be tormented day and night forever and ever.

"And I saw a great white throne and him that sat on it, from whose face the *earth and heaven fled away*, and there was found no place for them.

"And I saw the dead, small and great, stand before God; and the books were opened, and another book was opened, which is the book of life, and the dead were judged out of those things which were written in the book, according to their works.

"And the sea gave up the dead which were in it; and death and hell delivered up the dead which were in them; and they were judged every man according to their works.

"And death and hell were cast into the lake of fire. This is the second death.

"And whosoever was not found written in the book of life, was cast into the lake of fire.

"And the *first heaven* and the first earth passed away."

Most plainly herein, as foreseen by them, have the prophets physically described the final collapse of our terraqueous orb, and its departure from its present circular path.

At the destined hour, when the loud trumpet sounds, it suddenly becomes a globe of liquid fire, melted with fervent heat; a fiery lake, into which are cast all the enemies of the Prince of Peace, the last of whom are Death and Hell. The heavens are clean dissolved, and the sun no longer reigns. Then our

earth, an incandescent mass, with its oceans, lakes and rivers changed to steam, all its atmosphere and gases glaring with effulgent light, with a great noise breaks from her long accustomed rounds, and flees away from before the throne, to the distant realms of space; to that cemetery to which all "*wandering stars*" do go, where the blackness of darkness dwells forever.—Jude, ch. 13.

Thus clearly is it seen, that as at first she came, so at last she goes, "*A Comet*," a little burning star, with a train of glowing light streaming through the heavens.

Perhaps she burns again to refine and purify the earthly dross away; perhaps she roams the eternal wastes to cool, and darken, and again become a chaotic mass, without form and void.

And he said unto me, "*It is done*, I am *Alpha* and *Omega*, the *beginning and the end*."

The conclusion thus attained, when properly considered, is not in the least marvelous or wonderful, for such is the uniform course of nature in all her ways. Man's first stage in life is helpless infancy, unconscious of surrounding things, and his last stage is like it, a state of drivelling dottage and imbecility. Dust thou art, and to dust thou shalt return, is the Creator's law, and applies not to man alone, but to all terrestrial things. The tender herb, the towering tree, and the giant mammoth, arise from dust, and in their appointed times return to dust again. Nations and empires, too, come and go, but whence and whither, none may know. Even "the wind goeth toward the south and turneth about unto the north; and it whirleth about continually; and the wind re-

turneth again according to his circuits." "All the rivers run into the sea, yet the sea is not full; unto the place from whence the rivers come, thither they return again." "The sun, also ariseth, and the sun goeth down, and hasteth to his place where he arose." The earth itself is but a creature of the same Creator, and can be no exception to the law that rules in all its parts and members. It, too, must end as it began, to accomplish its appointed circuit. We cannot too deeply consider, nor too well comprehend, the full force of the trite scriptural maxim, so often and emphatically rung into our ears, "the first shall be last, and the last shall be first." I am the Alpha and Omega, the beginning and the end, is a significant truth, descriptive not of Him, who is without end or beginning, but of the works of his Almighty hands. The first is but a type of the last, and the last a reflection of the first; and if we can but discern the one, we may readily anticipate the other. Our earth, in the beginning, we found to be a glowing ball of chaotic matter, melted with fervent heat, with all things in it burned up, roaming wildly through the regions of infinite space, without a sun to bind her to her course. With truly parallel features do we foresee, that such will be her end. Six different days, or stages, at the first, mark the progress of the creation; so at the last are six different angels seen successively engaged in tearing down the work prior to its complete destruction. Following the six days of labor in the beginning, a seventh announces "that the heavens and the earth are finished." So in the end, the six laboring angels are followed by a seventh, who sounds, "that the mystery of God is finished; it is done."

The first Adam came to give physical life to a myriad host; the last, who is to come, will give perpetual life to all those who are His at His appearing; the first Adam was a natural being of the earth, earthy, and all his children partook of his infirmity; the last Adam will be a quickening spirit, and impart his spiritual gifts to all the members of his family. The first Adamland, in all its parts and members, was a true antetype of the last. That perished beneath a purifying flood of waters; this is doomed to expire in the midst of a still more purifying flood of fire. Even in this brief way is unfolded the significant import of the scriptural adage, "the first shall be last, and the last first."

When we say, however, that these things are not marvelous or wonderful, we can only use those terms as ordinarily applied, for truly and really they are wonderful in the highest degree. Yet not more so than all other matters which cease to be wonderful only because they have become familiar; not more so than that a little seed cast into the ground should swell and burst, and grow into an overshadowing tree; not more so than that an egg, by incubation, should become a bird, and soar aloft into the light and subtile air; not more so than that the grass, which to-day clothes the fields, may to-morrow, in the form of a sheep, walk and graze in the self-same pasture, and perhaps the next, as a monarch upon the throne, or a general in the field, be sealing the destiny of empires. Yea all things, even the smallest, are wonderful; and happily says the Psalmist, "I will praise thee, for I am fearfully and *wonderfully* made; *marvelous* are thy works, and that my soul

knoweth right well." And with equal force the Prophet, "His name shall be called 'Wonderful, Counsellor, the Mighty God, the Everlasting Father, the Prince of Peace.'"

To elucidate the page of prophecy relative to the present earth, revelations are made touching that which is to come hereafter. It is but little, yet all-sufficient for the purpose:

"For behold," says Isaiah, "I create new heavens and a new earth; and the former shall not be remembered, nor come into the mind."

"Nevertheless," says St. Peter, "we, according to his promise, look for new heavens and a new earth, wherein dwelleth righteousness."

"And," says St. John, "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 for her husband.

"And I heard a great voice out of heaven, saying, 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.

"And there shall be no night there; and they need no candle, neither light of the sun; for the Lord giveth them light."

The brief and limited descriptions of that new world, or earth, sufficiently teach that it will so greatly differ from the present that the prophetic scenes and visions will be, even in metaphor, wholly inapplicable to its nature; that for the physical, perishable forms, there will be no place at all. No deserts will there exist,

to blossom as the rose; no parched ground to become pools of water; no rushes, reeds or grasses, for the habitation of the dragon; no straw for the lion, as a bullock, to eat; no impure dust for the serpent's meat: children will not play in the streets of the city, and die an hundred years; neither will the days of the fathers be restricted to the days of the trees.

Diamonds, sapphires, rubies and emeralds, the scientific mineralogist assures us, have resulted from the crystalization of melted earths in the world's inception. This earth furnishes but few; so few that they are locked in costly caskets and kept from common eyes. That earth, in its preparation, will be so purified as by fire, that precious gems will be no rarity. The foundations of city walls will be garnished with all manner of precious stones; great pearls will constitute its gates, and transparent gold will pave its streets. That will have no sea; no ocean to send its vapors over the land, as rain or hail, snow or dew; not even tears will course the ever-blooming cheek. Yet there will be one pure river of water of life, clear as crystal, proceeding not from mountains' bases, but out of the throne of God and of the Lamb. The vegetable world will be the tree of life, skirting the river on either side, bearing twelve manner of fruits and yielding monthly; and the leaves will be for the healing of the nations.

The city will not need or have the sun or moon to shine upon it, and the elements of heat and light will not be derived from imperfect physical symbols, but be imbibed at once from the Father of Lights. New heavens as well as a new earth will then exist,

and there will be no night there, neither will Arcturus, Orion, or Pleiades, with their sweet influences, be seen twinkling in its firmament.

In that heavenly home there will be no excisemen or earthly vexations, but men may live perpetually without money and without price. The government, too, differs from all that this earth knows. Citizenship may be acquired for a little more than the mere asking. If one desires truly the freedom of the city, to be elected it is only requisite that he shall zealously become a candidate; and a refusal to apply is deemed a sufficient proof that the party really prefers some other government, and he is left to his own choice. No force or military rule is adopted there to coerce a party to submit to a rule to which he has not assented, for there the soundest and most liberal maxims prevail.

Surely such a world as that will not, cannot, at all resemble our present imperfect earth, not even in metaphor. This much is told us to light the page of prophecy; all other characteristics of that new world are purposely sealed from view.

"But thou, O Daniel, shut up the words, and seal the book even to the time of the end."—Dan. ch. 12: 4.

"And when the seven thunders had uttered their voices, I was about to write; and I heard a voice from heaven, saying unto me, Seal up those things which the seven thunders uttered, and write them not."—Rev. ch. 10: 4.

"And I knew a man (whether in the body, or out of the body, I cannot tell; God knoweth,) how that he was caught up into Paradise, and heard unspeakable

words, which it is not lawful for a man to utter."—2 Cor. ch. 3.

"But we speak the wisdom of God in a mystery, even the *hidden* wisdom which God ordained before the world unto our glory:

"But, as it is written, eye hath not seen, nor ear heard, neither have entered into the heart of man, the things which God hath prepared for them that love him."—1 Cor. ch. 2: 7.

When thus explicitly informed that the peculiar characters of that new earth are so entirely different from those we know, and that they are purposely and closely sealed from human view, until the time of the end, it is impossible to suppose, that notwithstanding, they are to be found metaphorically portrayed in the prophetic writings. To seek in the scriptures for things withheld; to look there for things unutterable and unlawful to be told; to see in them that which the eye hath not seen; to hear from thence what no ear hath heard, and to grasp that which human imagination has never conceived, is simply sporting with delusions. The millennial vision most clearly points to the last age of the present earth, when all the crooked places will be made straight, and all the high places be made low, resuscitating the Adamland of its first days, upon which the second Adam shall reign, till he shall have put down all *earthly* rule, and authority, and power, and put all enemies under his feet, the last of which is death. Then will the kingdom be delivered up to God, even the Father, when the present earth, where death has its sting and the grave its victory, shall have come to its end.

This grave and momentous subject has never been

presented to the consideration of man, not excepting the prophets and apostles themselves, without eliciting the immediate inquiry, "When shall these things be?" As the query involuntarily and universally arises, no doubt the reader, too, vehemently desires to know the "*when*." The astronomer might oblige him by deciphering the exact period that has elapsed since the star of the east rested in the sign of the fishes, Judah's symbol, and thus guided the wise men to the manger. But this they have not done, and we therefore are unable "to discern the face of the sky." Dr. Cummings has long been engaged with the prophetic figures, and hopes most certainly to fix the when. Yet it is to be feared that he will find such a tangle in the skein of time as will mar the accuracy of his solution; and then we are assured, that as a thief in the night, so will the last day come; and as arithmetic has not devised a rule by which to calculate the coming of the thief, we may well distrust the exact science for a certain answer. "The signs of the times," however, are very portentous, and indicative of its rapid approach. Before the Turkish moon shall cease to shine upon Zion's hill, we are foretold that there shall be much running to and fro in the earth, and knowledge shall be increased. The completion of the Pacific Railroad, and the Suez Canal, promises to accomplish the one of these precedent conditions, and the careful general reading of this book will certainly secure the other. The perplexities of the "Eastern Question" are becoming interesting to all nations, and the eyes of all are turning to the east; and there too, already, are the eagles hovering over the scene, even before the languishing

body has become a carcass. Vociferous tidal and other messengers frequently announce, through Peru and the adjacent regions, that the shattered dome of the Pacific is constantly crumbling, and toppling its huge masses into the liquid fiery lake, indicative of its rapid declension. Truly the omens thicken, and the voice is clear, that the time is near at hand when

> "At the destined hour,
> By the loud trumpet summoned to the charge,
> Shall all the formidable sons of fire,
> Eruptions, earthquakes, comets, lightnings, play
> Their various engines, all at once disgorge
> Their blazing magazines, and take by storm
> This poor terrestrial citadel of man."—DR. YOUNG.

But whether we may certainly divine the dread day or not, yet prophecy and philosophy both join in the affirmation that it must and will most surely come; that it hastens towards us upon the dashing, sweeping wings of time, and will be here soon enough for all—perhaps far too soon for very many. And, kind reader, although it may be very interesting to inquire and to know *when* the Books will be opened, and *when* you shall be required to close your account, for the deeds done in the body, there is still another question equally interesting, and far more momentous than the when, and that is the "*how?*" *How* will you answer in the august day, when judged according to your works? That inquiry admits of no aid from physical laws or science. For its determination, the wise men, instead of the astronomer, take the Star of Bethlehem for their guide; and passing by the philosopher and mathematician, you will most surely find

the Carpenter's Son an all-sufficient and proficient Teacher. The momentous How, then, is entirely for yourself alone; and the author, trusting that you will well and anxiously investigate it, with the warmest wishes for its happy solution, bids you a last and long—*adieu.*

THE MAP.

MANY maps would be requisite to present fully the action of the Flood at its successive stages, as the different portions of the earth would be raised to a level with the waters. Only a single one, however, is appended; the design of which is, to illustrate the course of the currents over the several continents, towards the end of the one hundred and fifty days, when only the greatest elevations were above the surface and controlling their course.

Only the leading mountain chains, such as would necessarily control the general course of the waters in the Universal Flood, are depicted on the map. The shaded parallel lines indicate the currents, and the arrows their course. The dotted line suggests the track of the ark. The red marks specify volcanoes, both active and extinct.

The Himalaya is the highest continuous range upon the globe, many peaks attaining heights from 19,000 to 26,000 feet. Hindoo Kosh, or Kooh, is a western continuation of the former, but diminishes in height.

North of Himalaya is a second range, extending to the Caspian Sea. This is lower than the first, and

its general elevation may be placed at about 10,000 to 11,000 feet.

The Caucasian chain, between the Caspian and Black Seas, is generally estimated to be about 8,000 to 9,000 feet.

The Zagros Mountains, on the west of Persia, are massive and continuous, but no estimates have been made as to the average height. Yet as some peaks reach the elevation of 10,400 feet, and those upon the Persian Gulf are 6,000, and the plateau of Shiraz itself, east of the Zagros, 4,480, it may safely be assumed that this chain is as high as Caucasus.

The Ural is stated at 4,700 to 5,000 feet.

Those of Arabia, bordering the Red Sea, are from 5,400 to 7,800 feet in height.

The Lupata chain, in Africa, has never been measured, that we are aware of; but on many portions snow remains perpetually, even under the equator; and it is, therefore, certain that the elevation of the chain is very great. The Abba Jaret, in Abyssinia, is fixed at 15,000 feet.

The Oregon, or Rocky Mountains, extend in two parallel chains from McKenzie's River, near the Arctic Ocean, to the Sierra Verde. Near the latter stands Mount Hooker, with an altitude of 15,700 feet, and near the northern terminus is Mount Brown, with a height of 15,990 feet.

The Sea Alps of California and of the northwest coast, run along the Pacific coast, with a height equal to the Rocky Mountains, and terminate with Mount St. Elias, the culminating point of the whole North American Continent, its height being 17,860 feet.

The table lands of Mexico range from 6,000 to 9,000 feet in height.

The Blue Ridge and Alleghanies have, as their mean elevation, 2,500 to 3,000 feet.

The Andes present three parallel chains, with peaks varying from 15,000 to 24,000 feet.