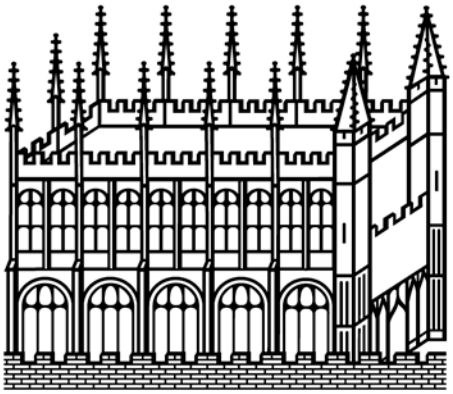

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The errors of evolution, ed., with an intr., by H.L. Hastings

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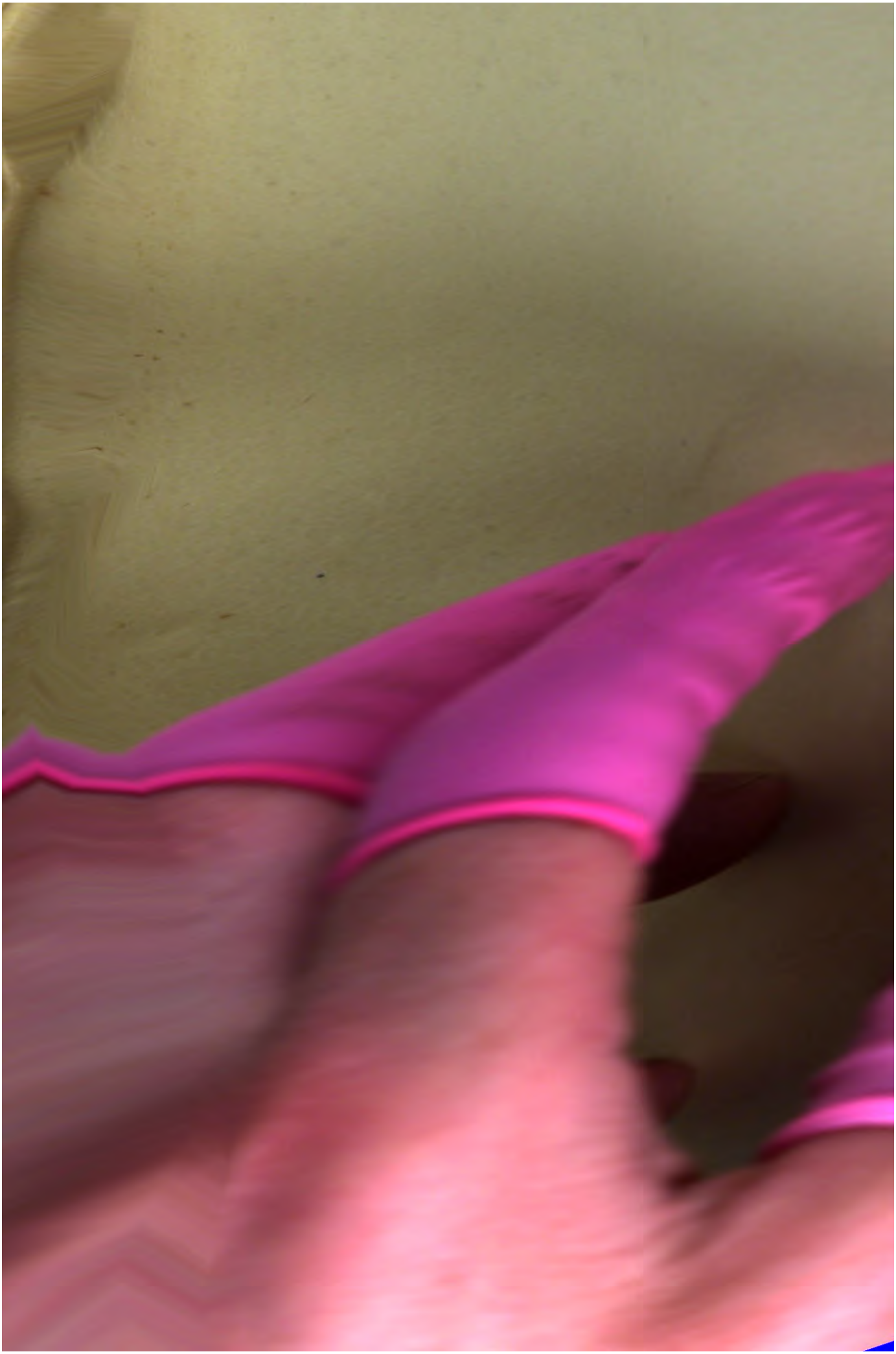

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THE ERRORS OF EVOLUTION.

AN EXAMINATION OF

THE NEBULAR THEORY,
GEOLOGICAL EVOLUTION,
THE ORIGIN OF LIFE,
and DARWINISM.

By ROBERT PATTERSON,
AUTHOR OF "THE FABLES OF INFIDELITY."

EDITED, WITH AN INTRODUCTION,
By H. L. HASTINGS.
Editor of THE CHRISTIAN, *Boston.*

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EDITOR'S INTRODUCTION.

It was "while men slept" that the enemy sowed tares among the wheat; and this parable illustrates the progress of evil in the world. It is through neglect and inattention that error finds place and takes root. It is in this way that skepticism has gained its foothold, while Christian teachers have failed to notice it, or have treated it with silent contempt.

Intelligence and information are not hereditary. The son of a philosopher may be an ignoramus. The wisest men must teach their children the simplest elements of knowledge, or allow them to grow up in ignorance of all that they themselves have learned. Hence the fact that Christian men have investigated and settled for themselves the great problems of faith and duty, avails nothing for others, even those most dear to them, who need, each for themselves, to re-examine and re-settle the same questions.

It is the habit of skeptics to ignore all that has been settled and established in Christianity; and this because, as a rule, skeptical men are untaught and uninformed concerning the facts and truths which pertain to the Christian religion. It is a subject they have never studied, and concerning which they have never been properly instructed. They may have gone to church as a matter of form, and have heard about the gospel in a general and traditional way, but they have never examined and weighed the evidences in the case.

No man is fit to confute a doctrine which he is too indifferent to examine or comprehend. But it would be hard to find many skeptical writers or speakers who have ever had even a fair look at the opposite side of the question, to say nothing of a practical experience of the gospel of salvation, without which all theories are but shells and husks.

There is, undoubtedly, bigotry among Christians, just as there are infidels and hypocrites among them; but there is also bigotry outside of all churches, and it is painfully apparent in those skeptics who, in their ignorance of the evidences which establish and confirm the Christian faith, rush headlong into the wildest speculations, and embrace the most absurd and unfounded theories, which in their turn are taken

up by skeptics yet more ignorant, and made the basis of the scoffs and jeers of men who risk their eternal destinies upon the bare assertions of persons whom they have never seen, and whose only claim to their confidence lies in the fact that they pretend they have studied science, and seem ready to make a sinner feel that he can go on in sin and not be afraid of an Almighty Creator.

If such men could only turn God out of his own world, they would feel quite at liberty to do as they liked. And if, instead of believing that they are the creatures of God, and so are amenable to his righteous and wholesome control, they can convince themselves that they are simply descended from some race of obscene and dirty little brutes, what is there to hinder them from imitating their degraded ancestors to their hearts' content?

Of course there is no disputing about tastes; and if a man chooses to put away his history, his heritage, and his hopes, as a son and creature of Almighty God; and trace his genealogy to the monkey, the mollusk, the moner, and the mud, we must respect his rights, and allow him to exercise his preferences; but when he insists that *we* shall also trace *our* genealogic line through ancestral apes and patriarchal pollywogs, we respectfully decline the honor. We prefer to look higher; and as there is still a little uncertainty among scientific men on the point, we propose to give ourselves the benefit of the doubt, and still look up to a Heavenly Father, instead of down to a little dot of a mud-spawned moner, as the source of our existence.

The author of this volume carries the war into Africa, and uses great plainness of speech. And it really seems high time that the battle be set in array, and that men find out who is on the Lord's side, and who is on the side of the devil and the monkeys. And the less we have of circumlocution in the case the better. Of course, this style of warfare is not very popular among those who like to wear the honors and emoluments of Christianity while laboring to teach heathenism and undermine the gospel; but as this battle is not fought in the interest of the apes or their progeny, they cannot reasonably expect to direct the campaign.

Those who hold that the author of this work is, like themselves, descended from some sportive monkey, will not, of course, be offended at any playfulness of logic which such an ancestry might entail; and those who have not debased their manhood by laying claim to a brutal origin, will remember that there was a time when even a prophet of the Most High could taunt the priests of Baal with the inactivity of a god who seemed to be either asleep or on a journey.

And when men, made in the image of the Almighty, devote their magnificent powers to proving that they are the offspring of apes and tadpoles, it may be questioned whether the subject has not ceased to be solemn, except as an illustration of the fatuity of men who plainly show their fallen state by the still lower alliances which they seek.

The world by wisdom knew not God. Great Egypt built pyramids and worshiped cats! Polished Greece erected magnificent temples where they might adore idols, and had thousands of prostitutes in their courts to facilitate their devotions. Mighty Rome, with thirty thousand gods in her Pantheon, built her Coliseum where ninety thousand of her citizens could sit and see hundreds of gladiators butcher and hack each other in pieces for their amusement. And the skeptical scientist of the nineteenth century, having turned his back upon that God who only hath immortality, and that Christ who has brought life and incorruption to light in the gospel, says to the monkey, Thou art my father; and to the tadpole and the moner, Thou art my sister and my mother! Athens wrote upon her altar, *Agnosto Theo*, but *still worshiped* "the Unknown God;" the modern skeptic, equally and more culpably ignorant, still writes himself an *agnostic*, but is proud of his ignorance, and refuses to adore the Great Unseen.

According to natural law, all variations of species tend to revert to their original types. Plants, developed by cultivation, if left to themselves speedily deteriorate. Human beings, deprived of opportunities for culture, quickly become degenerate. It does not require long ages to reduce a people to a lower level. In India, human infants, stolen and nurtured by wolves, develop only brutal instincts; and children, though of the highest birth, with such environment do not rise above a brutal condition.

Nor are the beneficial changes in the character of the human family accomplished through the slow and tedious processes of progression. Nations do not civilize themselves; some external force or impulse must change the course and current of their lives, to bring them to a higher plane. There are savages on earth to-day, after all the ages of progression, which are as brutal and barbarous in their instincts as were the inhabitants of proud, imperial Rome. But let the missionary, Bible in hand, reach their shores and preach to them the gospel of God, and a change comes, so sudden, radical, and permanent, that the fierce and blood-thirsty savages cast aside their idols and turn to the Lord, and the whole condition of society becomes so altered in a single life-time, that they gratefully inscribe upon the

monument of the servant of God, "WHEN HE CAME HERE THERE WERE NO CHRISTIANS; WHEN HE WENT AWAY THERE WERE NO HEATHEN."

The natural law of the reversion of variations to their original types, become of importance in estimating the future of mankind. If we deduce our origin from the monkey, the mollusk, the moner and the mud, then after all our boasting and progression, we may expect to go back the way we came, and retrace our steps through monkey, mollusk and moner, till we finally reach the mud again. But if we can lay claim to a divine origin, and if man is but a lost prodigal, wandering from his Father's house, we may hope, through the mercy of God who sends the words of salvation to the erring, that some—who seek alliance not with the beasts that perish, but with the living Creator—may yet regain the high estate from which mankind has fallen, and rise even higher than man has ever been before, until at last they stand in the image of God, equal with the angels, and children of God, being children of the resurrection. And if those who have sought alliance with God become godlike, being made partakers of the same divine nature, while those who have turned their faces towards the brutes should "as natural brute beasts" "utterly perish in their own corruption" would not *this* be a notable instance of "the survival of the fittest?"

It is in the hope of turning some benighted soul back from groping in primeval mud, to the knowledge of God and the eternal life that is in his Son, that these pages are sent forth; with the prayer that they may enlighten those who sit in darkness, and confirm the wavering faith of unwary souls who, through "the oppositions of science falsely so called," have been shaken from their steadfastness, and bewildered with false theories and doubts that they know not how to solve.

The time for quietness and apathy is past. Iniquity comes in like a flood. Lax thinking leads to lax living, and indifference only encourages the assaults of the ignorant and presumptuous, while it perplexes and disheartens the timid and the untaught. Truth will outride the storm. The old anchor yet holds. That Word which has outlived so many assaults and assailants, yet abides the test—the anvil stands fast when all the hammers are worn out; and though the grass withereth, and the flower fadeth, yet "the word of our God shall stand for ever."

Boston, Oct., 1884. H. L. HASTINGS.

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PREFACE.

The theory of Evolution has been so popularized in the name of science, that many who know little about science accept it, and risk their souls' salvation on the word of the lecturer, or professor, or newspaper advocating it. This is merely superstition. It is scientific superstition, not one whit more respectable than religious superstition. And in this case it is dangerous; for we shall see that the theory of evolution is not scientific. It is not founded on facts. Its premises do not warrant the conclusions drawn from them. If the tree is to be judged by its fruits, it is poisonous. These things I propose to show in these pages. Taking the evolutionists on their own grounds—scientific foundation facts—I propose to show that the theory is unfounded, absurd, and degrading. I shall take the theory from its acknowledged prophets; and shall adduce my conflicting facts from scientists of acknowledged reputation. As the work is designed for the people, the illustrations will be as popular in style as the subject will permit.

The theory of Evolution is a *cosmogony*, or scheme of world-building, of world-wide comprehensiveness. It begins with the stars, and descends to the worms; nor does it exclude man and his affairs. Indeed, it proposes to include all human affairs—personal, social, political, and religious—in its domain. It is monarch of all it surveys; dethroning alike Moses and Mohammed, Kaiser and Calvin, Pontiff and President, by the supreme law of the Survival of the Fittest, applied unflinchingly alike to mammoths and ministers, and carried out by the most

diverse agencies from the glacial period to the age of nitro-glycerine. So we must prepare for a journey to the heavens above, and to the earth beneath, and to the waters under the earth.

The logical beginning of the theory is necessarily at the beginning of our universe. For though denying a beginning in words, yet practically its advocates must begin somewhere. They have chosen to begin with the stars and the heavens. We must follow them there, and see what sort of a business they make of star-building. Then we may inspect their progress in earth-building. After we have seen the astronomical and geological blunders of our builders, we will cease to be surprised at their mistakes in stocking their farm with mongrel breeds of cattle. And then we may drop in for a neighborly call, and see how they succeed in raising their little monkeys, and the peculiarities of their house-keeping. Their politics and religion will form interesting subjects of consideration. And we may conclude by a comparison of this new theory as a rule of life, and a basis of hope in death, with the old facts of Christianity.

On examining the theory of Evolution we observe that it naturally divides itself into five great divisions:

1. The Astronomical, or the Development of the Stars.
2. The Geological, or the Development of our Globe.
3. The Zoölogical, or the Development of Animals.
4. The Human, or the Development of Mankind in Society.
5. The Religious, or the Development of Christianity.

In this order the subject is treated in this work. The attempt is made to demonstrate the theory of evolution to be unscientific, irrational, and profane; and in conclusion, Christianity is proved to be a solidly established inductive science, capable of demonstration by experiment.

THE ERRORS OF EVOLUTION.

THE NEBULAR THEORY.

THE SCIENCE OF WORLD-MAKING.

The science of world-making has great attractions for the human mind. Man seems thus to prove his kindred to the Great Creator. The wisest and most learned have hoped to show how the universe was created, leaving all succeeding generations to laugh at their preposterous attempts. The Chinese cosmogonist shows us Pwangku chiseling out the granite heavens. The Greek introduces us to the primeval chaos, and the gods reducing it to order. The Hindoo shows us Brahm hatching the sacred egg, containing the seeds of all things, and producing worlds, and men, and beasts from its fruitful sphere. We justly ridicule these dreams as mere empty notions, incompatible with the science of our nineteenth century; but in what respect are our scientific cosmogonies less superstitious or absurd? You may say, those cosmogonies were the product of ignorance of the structure of the universe. Does any one pretend to *know* its structure now? Though we know a little more than our fathers, we also know that this advance in knowledge bears no proportion to the infinite ignorance which could presume, on the strength of our childish science, to attempt to describe the construction of an unknown universe. Nay,

the heathen cosmogonies were generally less impossible and absurd in principle than the fashionable cosmogony of modern science; for they at least assumed a power sufficient for the work—a living person, possessed of will, and energy, and intelligence, and so, competent to make and mould this beautiful cosmos into order, and to devise the laws of its nature, and see them obeyed. It was reserved for modern atheists to excite the laughter of the heavens by a plan of creation more ridiculous than Brahm's egg—an egg which laid and hatched itself without any Brahm—the Nebular Theory.

In our own day a class of men inspired by an utter dislike of the idea of God, set themselves with wonderful earnestness to devise some plan for the origination of the universe without the intervention of a Creator. Indeed from the dawn of history an atheist occasionally has proposed to account for the existence of the world by asserting the eternity of matter, in motion, in a state of chaos, and for its present arrangement by chance. But when the discoveries of Newton opened the door for the discovery of law and order and regulated motion, in the most distant corners of the universe, and, at the same time, chemistry began to show the existence of law and order in the construction of grains of sand and drops of water, by weight and measure, this old atheistic hypothesis of the formation of the world by chance was exploded. It was seen that there was no more chance in the running of the planets than in the running of the trains of a railway; that in fact they were far better regulated than those usually are.

The construction of cosmogonies became a fashionable amusement in the seventeenth century, and it was considered quite an easy operation. The celebrated Descartes said that he should think it a small thing to show how the world *is* constructed, if he could not also show that

it *must* necessarily have been so constructed. He, however, was quite ready to construct worlds on any plan, according to order. His first cosmogony was on the plan of the universe being a vacuum. His friend in Paris, Mersenne, informed him that the *vacuum* had gone out of fashion in Paris; whereupon he at once remodeled his theory, and demonstrated his celebrated system of the vortices, on the assumption that the universe was a *plenum*, full of various kinds of matter.* "Undoubtedly," says Whewell, "he tried to avoid promulgating opinions which might bring him into trouble;" preferring popularity and ease to truth; like Galileo, and other such complaisant heroes. These vortices of Descartes were soon reproduced and remodeled by other projectors.

LA PLACE'S PLAN OF WORLD-MAKING.

La Place, the best infidel mathematician of his day, set himself to investigate the construction of the solar system; with such success in his own opinion, that he was able to suggest several improvements on the Creator's plan, by which we might have better climates, and moonlight all the year. It involved, as Lionville shows,† the slight inconvenience that the arrangement would not last six months, and that its breaking up would involve moon, earth, planets, and sun in one universal crash of destruction. Our cosmogonist, however, was not daunted by such contingencies, from attempting a plan by which these worlds might have made and arranged themselves as we now find them. He devoted himself to the solar system merely; since, if he could show how that created itself, it would not be difficult to extend the process to all the stars.

The planets, as we now see them, display so many common features that it was perceived they must have had a

* *History of the Inductive Sciences, pp.* 1, 391.

† *Annual of Scientific Discovery*, 1868, p. 351.

common origin; and there are so many similar and orderly movements among them that the notion of a chance origin could not be entertained. La Place found that there were at least five great regularities controlling the whole system:

1. The planets all move in elliptical orbits, nearly circular; they might, on the contrary, have moved in direct lines, or in orbits as elongated as those of the periodic comets.

2. They revolve in orbits nearly in the plane of the sun's equator; while they might have revolved in orbits inclined to it in any angle, or even in the plane of his poles.

3. They revolve around the sun all in the same direction, which is the direction of his rotation on his axis.

4. They rotate on their axes, also, as far as known, in the same direction.

5. The satellites, with the exception of those of Uranus, revolve around their primary planets, and also rotate on their axes, in the same normal direction.

It was evident, even to believers in chance, that so many regularities were not produced by accident. La Place, computing the chances by the theory of probabilities, found that the chances were two hundred thousand billions to one against these regularities being the result of accident, and in favor of their having a common origin. The subsequent discovery of the asteroids has multiplied these probabilities a thousand-fold.*

Such was the immense preponderance of probability in favor of the existence of design, and, consequently, of a Designer, in the mechanism of the heavens, which La Place set himself to overturn. He cogitated the problem of accounting for all this order and regularity by a

* La Place puts the case even more forcibly when he says that the probability that all the motions of the planets originated in one primitive cause is two million times greater than the probability that the sun will rise to-morrow.

mere mechanical law; forgetting that even mechanical law demands a law-maker, who must himself be a mechanic.

But La Place supposed that, if he only had the material to make worlds out of, and the motion of rotation, which seems to be the fundamental and common motion of the whole system, he could produce all the existing bodies—sun, planets, moons, comets—and all their revolutions. Newton had discovered the law of gravitation, which gave the power, and Herschel had discovered the nebulæ, which seemed to offer materials for a cosmogony.

Herschel had discovered numerous nebulæ, or luminous clouds, in the distant heavens, shining with a distinct light, but which, with the highest telescopic powers he could apply, gave no appearance of distinct stars. They were of all shapes; some like wreaths of smoke, others crab-like, many were of a spiral form, but the greater part more or less globular, and condensed toward the centre, and in some a bright star in the centre was surrounded by a halo. Speculating on these strange forms, only two ideas presented themselves: either these nebulæ were systems of stars like our own Milky Way, whose remote parts present a nebulous appearance, which the telescope resolves into crowds of stars; or they are clouds of diffused luminous matter, like the matter of comets, and may, by condensation, become the material of worlds; and La Place assumed that they were such clouds, and that here was the material he needed for world-building. At that time nobody could prove the contrary.

Having thus obtained his materials, the next thing was to get the power to cause a rotation of the whole system. Gravitation was then the latest cosmical discovery. It does not appear that he was aware of the existence of another cosmic power as universal as gravitation, and equally powerful, which manifests itself to us under the forms of light, heat, and electro-magnetism; at least, he

took no notice of its necessary action upon the process of world-making. It is true he provided that his materials should be very hot, but he set his gravitation to conquer and expel the heat; while of the action of electricity he took no account whatever;—much as if one should construct a steamboat without making any account of the steam. Nor does he take any account of the ether which fills the celestial regions, and retards Encke's comet in its motions; probably because neither he nor anybody else knew, or can know, what it is. But to ignore it is as senseless as to construct the steamboat without any regard to the water in which she is to float. The only things he demanded for his world-making were gravitation and the nebulous fluid.

He set out by supposing that the sun and planets originally existed as a vast cloud of homogeneous, gaseous matter, intensely heated—a vast fire mist—in the regions of space, which were much cooler; and that this cloud, by the cooling of its exterior, began to shrink up, and settle down into a liquid, and then into a solid state. It was supposed that some parts would cool faster than others, and so condense more, and, therefore, exercise a greater attraction of gravitation in attracting the lighter portions toward them. These attracted parts, rushing toward the centres of gravity, would, it was supposed, meet with resistance from the rest of the mass, and so would be diverted from the right line of motion, and thus a spiral motion would begin, which would communicate itself by degrees to the whole mass, and thus a vortex would be formed, rotating around the common centre of gravity. As the speed of its rotation increased, and the outside would condense and grow heavy before the inside, the centrifugal force would throw off the outside, either in rings, or if not all of a like consistency, in fragments, which would keep revolving in the same orbits in which

they were cast off; and would revolve faster and faster as they grew more solid, and rotate on their axes also, with increasing velocity; until, like a factory grindstone exploding by increased centrifugal force, they would fly into fragments, or cast off rings, which would, in their turn, continue to revolve as moons and rings, like those of Saturn. The central body being the last remainder, and so exposed longer to the powers of condensation and gravity, would be the densest body of the system, and the planets would decrease in their densities as they increased their distances; as the lightest must have been thrown off first, and while the cloud was in a fluid, or even in a gaseous condition.

It should here be observed that La Place himself never pretended to assert that this *was* the mode in which the worlds were actually made; he merely threw out his notion as a hypothesis or supposition of a way in which they *might* have been made, by a mere mechanical law, without the direct creative agency of God. But this bare supposition of the possibility of thrusting God out of sight of his own works has proved so attractive to a certain class of minds, that, one after another, alighting in the honey, they have never been able to fly again, and have continued to grovel in the enjoyments of such a materialism; to accept it as a fact, to proclaim it as science, and to feed it out to the undeveloped larvæ of their colleges, as the primary assumption of that development dogma, which, progressing through a globe of fused granite, and a cooling ocean, develops man, body and soul, from the monkeys, which, in their turn, grew from the animalculæ brought forth from the fruitful ground.

THIS MOST ABSURD ASSUMPTION

is carried out into the grossest materialism. This mechanical motion of rotation originating in the nebulæ,

is declared to be the origin of the human mind, and all our thoughts are asserted to be merely modes of motion. Thus Herbert Spencer expounds the development theory: "Those modes of the unknowable which we call motion, light, heat, chemical affinity, etc., are alike transformable into each other, and into those modes of the unknowable which we distinguish as sensation, emotion, thought; these, in their turn, being directly retransformable into the original shapes. That no idea arises, save as the result of some physical force expended in producing it, is fast becoming a commonplace of science; and whoever duly weighs the evidence will see that nothing but an overwhelming bias in favor of a preconceived theory can explain its non-acceptance." "The solar heat is the final source of the force manifested by society."*

Yet even supposing all the outrageous assumptions of the theory granted, the atheist has not proved the eternity of matter, nor got rid of the necessity for a Creator. His "solar heat" must come from some pre-existing Cause. Even Spencer is careful to admonish his disciples that "It remains only to point out that while the genesis of the solar system, and of countless other systems like it, is thus rendered comprehensible, the ultimate mystery continues as great as ever. The problem of existence *is not solved;* it is simply removed further back. The nebular hypothesis throws no light on the origin of diffused matter; and diffused matter as much needs accounting for as concrete matter. The genesis of an atom is not easier to conceive than the genesis of a planet. Nay, indeed, so far from making the universe a less mystery than before, it makes it a greater mystery. Creation by manufacture is a much lower thing than creation by evolution. A man can put together a machine, but he can not make a machine develop itself. Those who hold it legitimate to

* *First Principles*, pp. 280, 294.

argue from phenomena to noumena* may rightly contend that the nebular hypothesis implies a first cause as much transcending 'the mechanical god of Paley,' as this does the fetich of a savage."†

It is true that this theory, as expounded by Christian writers, is not necessarily atheistic. On the contrary, they allege that it furnishes us with greater evidence of the power of God, and gives us higher ideas of his wisdom, to suppose a system of development of worlds under natural law, than their instantaneous creation by the direct exercise of his will. Undoubtedly, had God so pleased, he could have developed the worlds from clouds, according to some law; though even omnipotence itself could not accomplish that result by the nebular theory, as we shall presently see. God could have caused firmaments to grow from seeds, as forests do, or caused suns to develop by assimilation and growth, like fruits, according to some sublime law of celestial vegetation; and in that case we should have had the same kind of evidence of his power, wisdom, and goodness in *creation* by natural law, which we now possess in his *providence* by natural law, when he sends us rain from heaven, and fruitful seasons; and the evidence would have been as much greater as the heavens are greater than the earth. The first creation of the elements demands a creator; the contrivance of this law of development argues a contriver; the force, whether of gravitation, or any other force, must proceed from an agent. The nebular theory, then, can not obtain a logical foothold without God; as its Christian admirers very justly argue.

But we have to do now, not with the possible, but with the actual; not with the development theory as it might be made conducive to religion, but as it actually *is* used

* "From things *seen* to things *known*."

† *Illustrations of Progress*, p. 298.

as the grand fortress of atheism. It was devised in the interests of atheism. It promises at least to remove God out of sight, and so has attracted to its defense atheists and pantheists of all kinds. It is now held by thousands of half-educated men as a scientific proof of the existence of an eternal, self-developing universe, and of the superstition of the believers in a living God. Comte has devoted himself to the verification of the system. Spencer, and the positivist philosophers generally, are now busy in its reconstruction and defense. The *Westminster Review* expounds its mysteries. The whole tribe of pantheistic lecturers trumpet its absurdities as undoubted scientific truth, and scornfully taunt Christians with the discrepancies of the Mosaic cosmogony, from this sublime scientific development. Thus, through the scientific superstition of our age, a mere notion, unproved and improbable at the best, has come to be accepted as a fixed fact, on which thousands risk their souls. As no fiction was too marvelous for the Greek, if it were only done by magic, and located beyond the Euxine, so no absurdity is too monstrous for our modern philosophy, if it is only located some millions of miles away, and performed in the name of science.

SPECIMENS OF ATHEISTIC SELF-CONCEIT.

The contemptuous tone in which these men compare this notion with the Bible revelation of creation, could be justified only by the most demonstrable certainty of their facts and theories; yet, acknowledging that their facts are only bare assumptions, and their theory a mere possibility, Spencer permits himself to compare the word of God with the dreamings of scientific men, as follows: "Considered genealogically, the received theory concerning the creation of the solar system is unmistakably of low origin. You may clearly trace it back to primitive

mythology. . . . There is an antagonist hypothesis which *does not propose to honor the unknown power manifested in the universe by such titles as the master-builder, or the great artificer*, but which regards this unknown power as working after a method quite different from that of human mechanics, and the genealogy of this hypothesis is as high as that of the other is low. It is begotten by that ever-enlarging, ever-strengthening belief in the presence of law which accumulated experiences have gradually produced in the human mind." *

This is, you will say, bad enough. It is, however, by no means the ultimate reach of the impiety of the promoters of this dogma. The thorough-going atheism of this class of men, and their blasphemous assertions of a skill and science superior to those of their Creator, can only be exhibited in their own words. In their tracts, now before me, and the daily newspapers under their control, such assertions are common, and some of them are even more disgustingly offensive than the following from Comte, which has had a wide circulation in frequent citations:

"To those who are strangers to the study of the heavenly bodies, although frequently masters of the other parts of natural philosophy, astronomy has still the reputation of being an eminently religious science; as if the famous verse, 'The heavens declare the glory of God,' still preserved all its value. To minds early familiarized with true philosophical astronomy, the heavens declare no other glory than that of Hipparchus, of Kepler, of Newton, and of all those who have aided in establishing these laws. It is, however, certain, as I have shown, that all real science is in radical and necessary opposition to all theology; and this characteristic is more decided in astronomy than anywhere else, just because

* *Illustrations of Universal Progress*, p. 241.

astronomy is, so to speak, more a science than any other."

In answer to the claims of the evolutionists that Christians shall receive this

ATHEISTIC GUESS-WORK

as established science, we urge the following facts and considerations.

It is not science. Science is something *known*, but this theory is not known. It is not founded on facts; it is not proven; its advocates acknowledge that they cannot prove it at present; and we shall soon see that they *never can prove it;* that man must ever remain ignorant of the materials and forces of the universe.

The following extract from the lectures before the Lowell Institute, for 1865, will illustrate the way in which, in the opinion of the lecturer, a mere hypothesis is advanced to the dignity of true science: "The Nebular Hypothesis is to us modern naturalists what the gnostic cosmogonies were to the cabalists of yore, and is illustrated in a perfect manner by the genius of modern science. It has swelled rapidly to its present proportions by insensible degrees; by yearly accessions of facts, discovered and recorded in the different departments of inquiry. *Its constitution is purely mathematical. Grant its one postulate—that space was originally full of homogeneous matter obedient to the laws of physics—and its whole argument follows logically to the close; and it accounts for everything we see and know about the visible world.* And this first postulate is strictly *reasonable*, even if it turn out in the end not to have been *true;* for, first, it agrees with all the experimental observation as thus far made; and second, it is based upon a set of observations of its own—I mean the observations of the telescopic nebulæ. Nor can it be finally disproved and laid aside until more powerful telescopes shall have been

made to resolve into separate stars the last remaining nebulæ. And even then, the *a priori* possibility holds good. Saturn's rings will continue to discuss the question with any comet that may happen to drop in. It may not be scientific truth, for its demonstration has not yet been completed, but it is true science for all that; because it is the product of a fancy disciplined, mathematical, experimental, and observant."*

But the case is not by any means so simple as Mr. Lesley supposes. It is not a blank page on which he may write his guesses, on the slender chance that they may one day be shown to be right. Though were that the case it would give no warrant for the attempts of the evolutionists to overturn Christianity, nor for their arrogant blasphemies against the word of God. Their theory is not only not proven, but *it can never be proven;* it can never become successful.

SCIENCE KNOWS NOT WHAT THE WORLD IS MADE OF.

The Nebular Theory is a theory of world-building. In order to *build* anything—a house, or a ship, or a world—you must have materials to make it with, and you must have power to move and fix your materials. The architect, of course, must know of what materials he means to build his house, or his ship, or his world; and he must know the kind of power he means to use, whether of men, or horses, or of steam engines, and the amount of it, in the work of building.

There is a ship lying in the bay waiting for a cargo of wheat. One of our Nebular notionists comes along and admires the vessel. He proposes to describe to you the process of its construction. You ask him, "Were you present when this ship was built and launched?"—"No; but I know about it, just as well as though I had

* *Man's Origin and Destiny*, Philadelphia, 1868, p. 25.

been there."—"What materials have been used in building her? Is she oak-built, and copper-fastened? or is she only pine, treenailed? Or is that an iron ship? or is it made of Siemens' new steel plates?" To your astonishment your polite friend replies, "Indeed, my dear sir, I do not know of what materials that ship is built. I do not think anybody here knows. The only thing we do positively know is, that they are unlike any with which we are acquainted.* But I shall have great pleasure in giving you a scientific description of the process of building that ship."

That opens your eyes. You perceive that the poor gentleman has wandered from an asylum for the insane, and excuse yourself on the plea of business from listening to his lecture on ship-building.

This is exactly the state of the case with these theorists of the Nebular Hypothesis. They do not know the stuff of which even our own earth is built; and yet they pretend to teach us the process of its construction. Not only are they ignorant now of the materials of our globe, but they must always continue ignorant, till the day of the general conflagration; and it is probable that their attention may then be demanded by more urgent business. The proof of their ignorance is plain, and they do not deny it.

Let us look at the demonstrations of this assertion. Our earth is a globe of about 8000 miles in diameter. Two thirds of its surface are covered with water, and inaccessible to man. Of the remaining one third, more than half is almost as inaccessible, being covered with snows, arid sands, and forests. Of the accessible parts, less than one thousandth part has been penetrated by mines, or geologically observed where upheaved by earthquakes. The deepest excavations made have been

* *Reed's Geology.*

sunk less than two miles; and the greatest upheavals observed represent perhaps eight miles of original geological depth of strata, or one thousandth part of the diameter of the earth. It would be a gross exaggeration to say that anybody knows, or can possibly know, by observation, one millionth part of the substance of the earth.

It may be said that "we may judge the unseen interior of the earth from the rocks visible at the surface." But this is forbidden to us, for we know the density of the whole earth, including the surface of the sea, to be twice as heavy as granite; indeed to be about as dense as cast-iron. And when we ask, "What is this ponderous substance, heavier than iron, which constitutes the solid structure of our earth, compared with which the geological strata are thinner than a coat of paint on a brick house?" we are simply told, "It must be unlike anything with which we are acquainted." There is no dispute about this ignorance; nobody ever pretended to explore the interior of our globe; no one ever expects to observe its rocks and minerals, its strata, their dips and cleavages; science must be eternally ignorant of that subject.

SCIENTIFIC IGNORANCE OF THE HEAVENS.

The ignorance of these theorists regarding the materials of the sun, stars, comets, and nebulæ, is if possible still more profound and extensive. The sun has been burning for six thousand years at least; and were the earth a solid lump of coal, and projected into the sun, it would be consumed in a month, in a fire ten times as intense as is required to dissipate iron into vapor.* What is the fuel which feeds this tremendous fire? Science declares her ignorance. When we come down even to such plain matters as the heat of the sun, and the cold of infinite space—the two fundamental elements of the

* *Herschel's Outlines*, vi. sec. 400.

whole nebular business—we find the most conflicting statements put forth with the greatest positiveness by the most eminent scientists. But they cannot all be right, and it is possible that all may be wrong. As only one out of a score or more can be right, our faith in scientific assertions must be greatly shaken. For instance, the heat of the sun, according to Newton, is 1669° Fahrenheit; Pouillet, 1561°; Fourdroyant 7500°; Waterston, 9000°; Spencer, 27,000°; St. Clair Deville 9500°; Rosette, 20,000°; Secchi, 5,344,840°; Ericcson, however, thinks that is a little too hot for comfort, and reduces it one half, to 2,726,700° ;* Herschel and Pouillet made the temperature of space 224° below zero. The Mount Whitney observations make it twice as cold, 459° below zero. And they make the sun's heat about one half more than Herschel's estimate. † Now while scientific men are thus floundering and groping about so plain a matter as the *present* heat of the sun, how can they pretend to tell us about his heat millions of years ago? Yet the whole nebular theory depends on the cooling down of the sun's heat.

The comets are the most numerous of the bodies of our solar system. The number of comets in the heavens is said by an eminent astronomer to be greater than that of fishes in the sea. Of what materials are *they* composed? Science acknowledges again that she does not know. And yet these theorists pretend to describe to us the formation of suns and comets, of whose very *materials* they are themselves profoundly, grossly, and hopelessly ignorant!

Of the forces of even our own solar system they are equally ignorant, knowing a little of gravitation, but nothing of the others. The tails of comets sometimes shoot out, in less than a second, flashes extending

* *Eclectic Magazine*, July, 1880, p. 126.

† *Harper's Magazine*, cited in the *California Christian Advocate*, May, 5, 1883.

over two and a half degrees, or 4,600,000 miles. Here is a new power, or at least a new revelation of a power unknown before, traveling with more than twenty times the velocity of light.* What is this power? What force did its tremendous energies exert in the formation of the heavens and the earth? Again, science confesses her ignorance. And yet, in the face of these acknowledgments of ignorance of the fundamental facts of the problem, these theorists have the face to contradict the Bible as false, and to offer to tell us truly how the worlds were made, though they own that they do not know the forces employed in their construction, and never can know of what materials they are made! And they call that *Science!* Beside such science, spirit-rapping becomes almost respectable, and the writing on Slade's slates philosophical; for the spirits say they see what they reveal, but the Nebular notionists confess that they reveal what they do not see, what nobody has ever seen, and what nobody ever can see. And they expect us to follow their "disciplined scientific fancy" away beyond the realm of facts into the regions of atheism and despair. "If the blind lead the blind, both shall fall into the ditch."

OBJECTIONS TO THE NEBULAR ABSURDITIES.

We have seen that the Nebular Hypothesis is a mere empty theory, unproven and impossible to be proved, from our necessary ignorance of the materials of the world, and of the great cosmical forces used in its construction. This ignorance utterly demolishes its claim to be regarded as in any sense scientific. It is purely a work of imagination—as much so as the Arabian Nights' Entertainments—and of just the same authority as a record of facts.

I might rest the case here, and would do so, had not

* Dick's *Siderial Heavens*, chap. xx. Nicholl's *Solar System*, p. 76.

so many young people been lectured into the notion that this unfounded theory is science. It may be of service in disabusing them of this superstition, to show them the positive contradiction of this theory to the established facts of astronomy, to the first principles of mechanics, and to the law of gravitation; that it is not merely destitute of truth, but positively false, impossible, and preposterous. Though it is not generally easy to prove a negative, in this case the negative is demonstrated by recent discoveries in science. The most eminent astronomers and mathematicians have given us proof of its contradiction to the facts of the solar system; while chemistry has taken up the argument, and by her two great discoveries of the Correlation of Forces, and Spectrum Analysis, has enabled us to demonstrate that the heavens never contained any such sort of matter as the theory demands. The former of these discoveries overthrows the notion of an eternal motion, and the latter enables us to disprove the existence of eternal matter: and the eternity of matter and motion constitute the fundamental assumptions of the scheme.

The nebular theory is, moreover,

CONTRARY TO ALL ANALOGY AND EXPERIENCE.

No such process of the condensing of solid bodies out of flames is in progress in our world, or in any world which we have opportunity of examining. The burning of a lamp is not the manufacture of oil out of the flame, but the reverse. Nobody ever expects to see the burning of gas result in coal; the process of gas-making is not one of condensation, but the reverse—the conversion of solid bodies into gases. We know of no other way in which a continuous flame can be produced than by the combustion of some solid or liquid fuel. All the analogy, therefore, is in favor of supposing the nebulæ to be the

result of the combustion of former solid worlds, rather than worlds in process of formation. We know that such a process is in progress, but we do not know that the other process, of the condensation of worlds, is in progress. The meteors which illuminate our sky are flames produced by the combustion of solid meteorites, millions of which are thus consumed every year. The comets are not undergoing any process of condensation, but of dissipation. Should the planets of our system fall into the sun, as they all one day may, since they move in a resisting medium, they would not be condensed but dissipated into flames. Comte himself asserts that, when the last of them is consumed, the sun, also, will become a nebula; the very reverse of the ultimatum of the Nebular Theory. The fixed stars are not undergoing any such process of condensation, but, like our sun, blaze up as satellites impinge upon them, and dissipate these solid bodies. The star *a Coronæ* which was seen to blaze up with astonishing splendor, increasing from the eighth to the second magnitude in eight days, in May, 1866, told the story of its hydrogen flame. The ocean of one of its satellites was on fire;* and one of these immense bodies was dissipated into vapor; in twelve days the star diminished to its former insignificance.

Not a single fact has ever been adduced to show any natural process of the condensation of inflammable gases by combustion; but on the contrary, their combustion is always a process of expansion.

Nor have we any reason to believe a state of combustion to be the primary condition of matter; since, so far as our experience goes, it is always a result of some previous combination. Neither in this world, nor in any other that we know, can we get fire without coals or fuel of some kind; but this is a plan to produce flame without

* *Annual of Scientific Discovery*, 1866, p. 240.

coals, and then to condense the coal out of the flame. The idea is certainly an eminently *original* invention, being suggested by no fact in heaven or in earth.

IT IS CONTRARY TO THE FACTS OF ASTRONOMY.

1. *It is contradicted by the periods of the revolutions of the planets and comets.* La Place's theory was supposed to be confirmed by certain abstruse mathematical calculations of the times of the supposed rotation of the globe of fire-mist on its axis, when it filled successively the orbits of Saturn, Jupiter, and the other planets, which Comte, the great leader of modern atheism, declared he had found to correspond exactly with the times of the revolutions of those planets around the sun. Of course it was not hard to do this, when one knows beforehand the times of the revolution of the planets, and can make the time of the rotation of his cloud anything he pleases, by either throwing out freight, or putting on steam, or both. But common people can not follow a mathematician into such abstruse calculations, and most scientific men will not; because they have not time, and are rather inclined to accept, than to doubt, an imposing display of algebraic symbols. Hence, even such men as J. Stuart Mill accepted the alleged coincidence; and the author of the most popular exposition of the system, *The Vestiges of Creation*, appeals to it as almost a mathematical demonstration of its truth. But Sir John Herschel set himself to examine these pretended calculations, and found that Comte had found out his answer beforehand, and then thrown out facts and figures to reach it; or as school-boys say, had forged the answer. In his opening address to the British Association of 1845, Herschel thus pillories Comte's mathematical forgery:

"If, in pursuit of this idea, we find the author first computing the time of rotation the sun must have had

about its axis, so that a planet situated upon its surface, and forming part of it, should not press upon that surface, and should, therefore, be in a state of indifference as to its adhesion or detachment; if we find him in this computation throwing overboard as troublesome all those essential considerations of the law of cooling, the change of spheroidal form, the internal distribution of density, the probable non-circulation of the internal and external shells in the same periodic time, on which alone it is possible to execute such a calculation correctly, and, avowedly as a short cut to a result, using as the basis of his calculation, 'the elementary Huygenian theorems for the evaluation of centrifugal forces in combination with the law of gravitation' (a combination which, I need not explain to those who have read the first book of Newton, leads direct to Kepler's law); and if we find him then gravely turning around upon us and adducing the coincidence of the resulting periods, compared with the distances of the planets, with this law of Kepler's as being the numerical verification in question—where, I would ask, is there a student to be found who has graduated as a senior optime in this university, who will not at once lay his finger on the fallacy of such an argument, and pronounce it a vicious circle?"

M. Babinet, a distinguished member of the French Academy of Sciences, has submitted this problem of the rotation of the nebulæ to the scrutiny of a *real* mathematical analysis. Adopting the present period of the sun's rotation about his axis, scarcely 25 3-10 days, he has proved that the rotation of the nebular matter at the distance of the earth must have been 3181 years! and at the distance of Neptune, nearly three millions of years (2,862,900); "numbers" he says, "so infinitely superior to those which mark the times of revolution of the earth and Neptune, that it is impossible to admit that these

planets have been formed from the mass of the sun expanded to the planetary orbits." *

2. *The theory is contradicted by the densities of the planets.* At the time La Place constructed his theory, the densities of the planets were either unknown or erroneously valued. He constructed his theory to suit these errors. Astronomers are now agreed as to the error of Newton, and La Place, and Kepler, in supposing that the densest bodies were those nearest the sun. Kepler declares "the sun to be the densest of all cosmical bodies; because it moves all others which belong to his system." Newton argues: "The bodies of Venus and Mercury are more ripened and condensed, on account of the greater heat of the sun. The more remote planets, by want of heat, are deficient in these metallic substances and weighty minerals with which the earth abounds. Bodies are denser in proportion to their nearness to the sun." †

La Place calculated his system accordingly, and made his outside planets, which were first cast off, light in proportion to their distance from the sun, while those nearest, which had condensed most, were made heavy accordingly. For instance, he calculates the density of Mercury, to make it square with his theory, at 2.585; which indeed was a little less than was then generally supposed; while it is in reality now found to be only one half of that, or 1.234—a very little heavier than the earth. The sun, which ought to be the densest body of the system by the theory, is actually much lighter than the earth, and stands fifth in the order of densities. There is no correspondence whatever between the distances and the densities of the planets. The actual order of the solar system, as to density, is given by Humboldt as follows: Saturn, 0.140 of the earth's density; Uranus, 0.178; Neptune, 0.230;

* Sir David Brewster, in *Good Words*, 1862, p. 9.

† Cited in *Cosmos*, iv. p. 447.

Jupiter, 0.243; Sun, 0.252; Venus, 0.940; Mars, 0.958; Earth, 1; Mercury, 1.234.* Thus it appears that the sun is but little denser than Neptune, the outer planet of the system—exactly the reverse of La Place's nebular hypothesis.

This objection, of the inconsistence of densities, comes with even greater force from the comets of our system. They are by far the most numerous family we have. Kepler says that there are more comets in the heavens than fishes in the ocean. At any rate, astronomers calculate their numbers within our solar system at two or three millions. Now these, according to the theory, should not be within the solar system at all, nor within millions of miles of it, but away in the outer margins of space among the nebulæ, since they are lighter than vanity. Every comet which shows its light head among solid worlds mocks at the Nebular Hypothesis.

3. *The other arrangements of the solar system were found to be equally at variance with the demands of the theory.* The orbits of the comets, being inclined at all angles to the sun's equator, are often out of the plane of his rotation, and fly right in the face of the theory. The moons of Uranus revolve in a direction contrary to all the other bodies, and so contrary to the theory. The palpable difference between the luminosity of the sun and of the other bodies, is in itself a sufficient refutation of the theory which would make them all out of the same materials, and by the same process, and moreover refutes the notion of their common origin by any mere mechanical law, as Newton shows: "The same power, whether natural or supernatural, which placed the sun in the centre of the six primary planets, placed Saturn in the centre of the orb of his five secondary planets, and the earth in the centre of the moon's orbit; and, therefore, had this cause

* *Cosmos*, iv. p. 446.

been a blind one, *without contrivance or design*, the sun would have been a body of the same kind with Saturn, Jupiter, and the earth; that is, *without light and heat.* Why there is one body in our system qualified to give light and heat to all the rest, I know no reason but because the Author of the system thought it convenient." *

The great expounder of modern science, Humboldt, is equally explicit in enumerating the decisive marks of will and choice in the construction of our solar system; and in contemptuously dismissing the notion of creation by natural law or development, from the halls of science: "Up to the present time we are ignorant, as I have already remarked, of any internal necessity—*any mechanical law of nature*—which (like the beautiful law which connects the square of the periods of revolution with the cube of the major axis) represents the above-named elements—the absolute magnitude of the planets, their density, flattening at the poles, velocity of rotation, and presence or absence of moons—of the order of succession of the individual planetary bodies of each group in their dependence upon distances. Although the planet which is nearest to the sun is densest—even six or eight times denser than some of the exterior planets, Jupiter, Saturn, Uranus, and Neptune—the order of succession in the case of Venus, the Earth, and Mars is very irregular. The absolute magnitudes do, generally, as Kepler has already observed, increase with the distances; but this does not hold good when the planets are considered individually. Mars is smaller than the earth: Uranus smaller than Saturn; Saturn smaller than Jupiter, and succeeds immediately to a host of planets which, on account of their smallness, are almost immeasurable. It is true the period of rotation generally increases with the distance from the sun; but it is in the case of Mars slower than in

* *Optics*, iv. p. 438.

that of the earth; and slower in Saturn than in Jupiter." "Our knowledge of the primeval ages of the world's physical history does not extend sufficiently far to allow our depicting the present condition of things as one of development."*

4. *Herschel's discoveries of the nebulæ, with their varied forms and spiral motions, and his speculation that they might possibly be the materials of worlds in process of condensation, give no support to the theory.*

In the first place, Herschel never assumed any such absurdity as the existence of homogeneous matter as the materials of heterogeneous worlds like ours. He supposed his nebulæ to contain all the materials of worlds in the form of gas. This was the very reverse of the atheist's nebulæ, which must necessarily be homogeneous (or of only one kind of matter), as we shall presently see.

In the second place, the process of condensation, if such a process be in operation, has not generally resulted in the divergence of planetary systems with rings and satellites, as must have been the result of a physical law; but on the contrary, in the general formation of globular systems of mutually encircling and revolving suns, as contrary as possible to the requirements of the hypothesis. Sir John Herschel thus marks the difference between the fact and the theory: "If it is thus to be regarded as receiving the smallest support from any observed numerical relations which actually hold good among the elements of the planetary orbits, I beg leave to demur. Assuredly it receives no support from the observation of the effect of siderial aggregation, as exemplified in the formation of globular and elliptic clusters, supposing them to have resulted from such aggregation. For we see this cause working out in thousands of instances, to have resulted, *not* in the formation of a single large central body

* *Cosmos*, iii. p. 28; and iv. p. 425.

surrounded by a few smaller attendants, disposed in one plane around it, but in systems of infinitely greater complexity, consisting of multitudes of nearly equal luminaries, grouped together in a solid globular or elliptic form. So far, then, as any conclusion from our observations of nebulæ can go, the result of agglomerative tendencies may indeed be the formation of families of stars of a general and very striking character, but we see nothing to lead us to presume its further result to be the surrounding of those stars with planetary attendants."*

It thus appears, from the testimony of the most eminent astronomers, that so far from the facts of our solar system giving any support to this theory, they are utterly opposed to it; neither the positions, magnitudes, densities nor revolutions of the planets, could by any possibility, have resulted from any such arrangement as La Place proposed. As to the other clusters in the heavens, which are supposed to have originated from condensing nebulæ, they have an entirely different appearance, and a construction as much the reverse of that of our solar system as it is possible to have in a system of rotation. Supposing the existence of a nebulous fluid, and the possibility of its rotation as proposed, the present solar system could not have been produced by it. The friends of the Nebular Theory have, therefore, been obliged to reverse its arrangement, recently, to make it conform to the progress of science.

NEBULAR THEORISTS CHANGING BASE.

5. *The theory as now advocated by Spencer, Comte, Helmholtz, Tyndall, and all its modern friends, is exceedingly different from that originally proposed by La Place.* Its main features are thus presented in the American Cyclopædia: "Assuming, for the sake of the argument, a rare,

* *Address to the British Association*, 1845.

homogeneous, nebulous matter, widely diffused through space, the following successive changes will, on physical principles, take place in it: (1) Mutual gravitation of its atoms; (2) atomic repulsion; (3) *evolution of heat*, by overcoming this repulsion; (4) molecular combination, at a certain stage of condensation, followed by (5) *sudden and great disengagement of heat;* (6) lowering of the temperature by radiation, and consequent precipitation of binary atoms, aggregating into irregular flocculi, and floating in the rarer medium just as water when precipitated from air floats into clouds; (7) each flocculus will move toward the common centre of gravity of all, but being an irregular mass in a resisting medium, this motion will be out of the rectilineal, that is to say, not directly toward the centre of gravity, but toward one or the other side of it; and thus (8) a spiral movement will ensue which will be communicated to the rarer medium through which the flocculus is moving; and (9) a preponderating momentum and rotation of the whole mass in some one direction conveying its spirals toward the common centre of gravity." *

This, it will be seen, is just the reverse of La Place's action. He began with a red-hot nebula, and derived his power from its cooling; they begin with a cold nebula and proceed to heat it up by the power of gravitation. How immense the interval must be between a heat which originally held gold, and iron, and granite, not only melted but in vapor, and the cold of a nebula which required the compression of millions of miles to produce heat enough to keep water from freezing, we have no means of estimating; but that is the difference between the original inventors and the modern improvers of the nebular hypothesis. La Place's fire-mist cooled and *condensed in the cooling*, and so he made his last-formed planets, and the sun, the most condensed bodies of the system;

* *American Cyclopædia*—Article, *Nebular Hypothesis*, xii. p. 158.

surrounded by a few smaller attendants, disposed in one plane around it, but in systems of infinitely greater compass, consisting of multitudes of nearly equal luminaries, grouped together in a solid globular or elliptic form. So far, then, as any conclusion from our observations of nebulæ can go, the result of agglomerative tendencies may indeed be the formation of families of stars of a general and very striking character, but we see nothing to lead us to presume its further result to be the surrounding of those stars with planetary attendants."*

It also appears, from the testimony of the most eminent astronomers, that so far from the facts of our solar system lending any support to this theory, they are utterly opposed to it. Neither the positions, magnitudes, densities, nor motions of the planets, could by any possibility have resulted from any such arrangement as La Place supposed. As to the other clusters in the heavens, which are supposed to have originated from condensing nebulæ, they have an entirely different appearance, and a construction as much the reverse of that of our solar system as it is possible to have in a system of rotation. Supposing the existence of a nebulous fluid, and the possibility of its rotation as proposed, the present solar system could not have been produced by it. The friends of the Nebular Theory have, therefore, been obliged to reverse its arrangement, recently, to make it conform to the progress of science.

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* *American Cyclopædia*—Article, *Nebular Hypothesis*, xii. p. 158.

but Spencer sees that it will never square with the actual state of things as discovered by modern astronomy, and so he reverses the process; he begins to heat up his nebula, *and condenses it in the heating.* The last error is, if possible, worse than the first; it is hard to know which of its absurdities to select for illustration.

It does not answer the purpose of its inventors, viz., to reconcile the irregular distances and densities of the planets with the regular order required by the theory. It merely reverses the order in regard to heat, but leaves the force of gravitation still in action, requiring a regular progress of density in the planets from the newest to the oldest; but there is no such order, nor any order whatever of this kind, as we have already demonstrated.

Nor has anybody, save Mr. Spencer himself, been able to see how worlds so heterogeneous as ours could have been made out of no other materials than a homogeneous gas, whether hot or cold, by any process, either of boiling or baking. In this world of ours, if we put a leg of mutton into a pot, we do not find that any amount of boiling, or gravity either, will turn it into a plum-pudding; but to find a simple gas boiled down into mutton, and plum-pudding, and cook, and company to boot, passes our simple comprehension.

There is a moral objection against Mr. Spencer's proposal which does not lie against the original theory. That theory brought us all, at least all survivors, through hell-fire some ages ago, and left us cooling off a little at present. But Mr. Spencer calmly proposes to hurl us all, young and old, men, women, and little children, saints as well as sinners, into a fire a hundred times hotter than the fire and brimstone which the Bible threatens as the doom of the wicked. There is no escape, no salvation for any one; since Mr. Spencer admits no God, no Saviour, into his world. Hurled at last into the sun, body and soul,

every human being, good and bad, must burn in worse than hell-fire, with no prospect of ever getting out. That is the gospel of light and sweetness for the sake of which our skeptical friends curse Christianity and scoff at the Bible!

It is a slight objection, also, to our acceptance of cold nebulous fluid as the material of our globe, that there is no such thing in existence, neither in the heavens, nor in the earth; nor is any such thing possible as a cloud of vaporized metals intensely cold. All the metallic nebulæ of which we have any knowledge consist of flames of fire sufficiently hot to vaporize the metals existing in them. Even the aqueous clouds of our atmosphere, though they contain no materials for the building of a solid world, are infinitely warmer than the nebulous fluid of the hypothesis. But there is no agency known to man capable of expanding the water, metals, rocks, and clays of our earth into vapor but intense heat. The notion, then, of an intensely cold nebulous fluid, is such a gross contradiction in terms that it can not be entertained for a moment. The original absurdity was bad enough, without encumbering it with this impossible nonentity.

This modern improvement was made before the discovery by the spectroscope, of the composition of the nebulæ by the spectrum analysis, as will be presently illustrated. The nebulæ were so far off that it was never imagined that anybody could tell whether they were hot or cold, and so there was no great risk, it was supposed, in cooling them down to make them suit the theory; for our world-makers are absolute and sovereign in the manufacture of facts, as well as fancies, to support their theories. But now that our astonished nebularists are confronted with the gaseous flames of the nebulæ in the spectroscope, they are compelled to make another change of base, and are already on the retreat back to La Place's original fire-mist. What confidence can common people

repose in the theories of such self-contradicting philosophers who in their theories not only contradict themselves, but also condradict the first principles of mechanics, and profess to exhibit in the universe

A HUGE PERPETUAL MOTION MACHINE,

which, more manageable than such machines usually are, invented itself, constructed itself, started itself and keeps itself running.

6. *The motion described in this theory cannot be produced by the proposed machinery; nor can any motion whatever be originated by any machinery; nor, if otherwise originated, can motion be eternally maintained by this, or by any machine.* This theory is only another plan of the Perpetual Motion; which, all mechanics are agreed, is an impracticable notion, contrary to the principle that action and reaction are equal. This principle holds good in heaven or in earth, wherever matter exists, and while it exists the construction of any machine to generate power is impracticable.

Its practicability was, however, supposed to be proved by a model made by Plateau, to demonstrate the modes of molecular attraction, and the manner in which centrifugal force acts in overcoming it. By means of clock-work, he caused a globule of oil to rotate in a mixture of alcohol and water of *the same density*, thus getting rid of the power of gravitation. By increasing the velocity he caused it to flatten out into a disc, and finally to scatter into a number of minute drops, which continued their revolutions as long as the vortex of the fluid in which they floated was kept in motion by the outside machinery. But this could give no illustration of the nebular theory, since the conditions are entirely different. Here the central globule, the divergent drops, and the surrounding liquid, *are all of the same density;* while the essential

condition of the nebular theory, on which the whole operation depends, is, that the central mass be of a *greater density than the surrounding ether*, so as to exert the attraction of gravitation upon its surface, and contract itself; and, moreover, that the cooling and contracting rings *be of a different density from the rest of the mass*, cooler and heavier, as the condition on which their separation depends; while the third and greatest difference is that *Plateau's centrifugal force was applied from without*, while La Place's was to be *begotten by the machine itself*.

It is quite plain to every miller that no current, or vortex, behaves itself in the way proposed by the Nebular Theory. You never see the saw-logs projected out of the river from the velocity they have acquired from it, much less the pebbles of the mill-race projected into the air by the force of the current, which is the only force proposed by the theory. Supposing La Place's rotating cloud to cool, and condense, and break into fragments at the outside, these being heavier than the rest would sink toward the centre, *and would stay there as long as the rotation continued;* for a vortex will never allow anything heavier than itself, carried by its current, to remain beyond its centre. Thus we should have, not a series of rings or planets, but one great globe with all the solids at the centre, a liquid covering, and a gaseous atmosphere. The same result would attend the process of cooling, as every boy knows who has seen a blacksmith hoop a cart-wheel, and noted how the red-hot iron hoop contracts as it cools, and closes in more tightly on the wheel in consequence. So the only planetary ring that we can see, that of Saturn, has been closing in upon that planet since the days of Huygens, and before many years will be united with it.* But this nebular fluid keeps cooling

*Sir David Brewster, *More Worlds than One*, 35. Prof. Struve says it has fallen down, 1872.

and shrinking up in the inside, while the outside of the very same material *keeps cooling faster*, and, instead of contracting faster accordingly, keeps widening out from the inside; a piece of schismatic behavior without parallel either in heaven or earth.

Plateau himself never adduced this experiment in support of the Nebular Theory, but having by way of illustration spoken of the revolving drops as satellites, and finding that expression misunderstood, he corrected the error in a subsequent paper. He says: "It is clear that this mode of formation is entirely foreign to La Place's cosmogonic hypothesis; therefore, we have no idea of deducing from this little experiment, which only refers to the effects of molecular attraction, *and not to those of gravitation*, any argument in favor of the hypothesis in question; a hypothesis which in other respects we do not adopt." *

The proposal to originate force to cause the motion, by machinery, is only another form of the Perpetual Motion notion, which has always proved so attractive to speculative minds. It seems to endow us with some of the powers of Deity. Nothing challenges our admiration more than energy, force, the power of producing motion. We admire it in the race-horse, in the rushing locomotive, and chiefly in the perpetual motions of the earth and sun. It seems to us to lie at the root of all life and power. Could we only succeed in producing a machine which could create power to run itself, and have a surplus of available force, we could multiply such machines to any extent, and apply that force to all the services of life. We could employ the motion, for instance, to produce friction and thus convert it into heat; and by intensifying the heat could make light; and in the evolution of these produce electricity and chemical action. Some

* *Taylor's Scientific Memoirs*, Vol. V.—Cited by McCosh, *Typical Forms*, p. 403.

even suppose that by means of chemical action and electricity they can generate life and thought. Thus to produce and sustain all the phenomena of the universe—the light and heat of the sun and stars, the movements and seasons of the earth, the various tribes of plants and animals, and all the activities of the souls of men—it was two thousand years ago supposed by Anaximander that we need but matter and motion. Give our cosmogonist the atoms which now form the universe, put them in motion, and give them time enough, and they will arrange themselves as we now find them, without any need of a Creator. But there is this fatal objection to this theory, that it is as hard for us to believe in an eternal motion, as in an eternal mover—God; and, moreover, it deprives us as effectually of the pleasure of making a cosmogony. The eternal Perpetual Motion was, therefore, abandoned for a time.

The idea of the creation of force, however, was only the more earnestly pursued by men who desired to be independent of God; and the power which the control of a Perpetual Motion would give its possessor, and the profit which it might acquire for him, stimulated all manner of researches. Animals seem to possess a power of creating force, and man especially seems capable of applying it to every purpose. Man is a machine composed of levers and joints, and seems to walk by throwing himself forward, now to this side, now to that, and to move forward by these impulses of gravity. A Perpetual Motion was therefore constructed, by which a ball was made to run down a hollow arm radiating from a free axle, and it was expected that it would thus acquire impulse enough to run up another arm at right angles to the first, then back again, and thus keep running alternately downhill and uphill, and thus by its continually changing the centre of gravity keep the axle continually rocking. This was the

simplest form of the Perpetual Motion. Though ten thousand different constructions have since bewildered the brains of inventors, there is not the slightest difference in their principle; they all proceed upon the principle that gravitation can produce perpetual motion. They all believed in the royal strategy celebrated in song:

> "The King of France, with forty thousand men,
> Went up the hill, and then came down again."

If His Majesty went up the hill he was pretty sure to come down again, but the difficulty was in getting him to repeat the performance. It was a hard matter to get him half-way to the top the second time, harder to persuade him to make half that ascent the third time, but the fourth he absolutely refused altogether. That is the difficulty with all our Perpetual Motions—they will not keep going; they will stop.

The reason of this perverse stoppage was long a puzzle to the greatest philosophers. By dint of many experiments, however, they discovered the great mechanical principle, that action and reaction are equal, and, consequently, that a machine cannot create power. Our schoolboys now know that the only use of any machine is to apply, or change the direction of, some outside power. The mill-wheel only uses the weight of the falling water to turn the millstone; if the water ceases to fall, the power ceases, and the mill stands still. There is no power in the steam engine, the power is in the heat passing out of the fire into the water in the boiler, and expanding into steam. There is no power in a clock, the power is in the man who winds it up. In a word, there is no power in machinery; so a mechanical Perpetual Motion is impossible. No machine made of iron, or brass, or wood, has any more power to create motion than a paving-stone lying in the street, nor to continue any motion given to it. It can only use the force given to it from

without, and diminish it considerably by its friction.

Though, now that this is expounded and demonstrated by numberless experiments, all this seems quite plain to us, it is not much more than a century since the ablest mechanics believed in the possibility of creating, or at least multiplying power, and spent years in constructing and devising all kinds of Perpetual Motions. They were men who astonished their fellows with their achievements, and were believed to have acquired supernatural powers. The elder Droz constructed a writing-boy; for which he and the boy were imprisoned by the Inquisition. The younger Droz built an automaton which played the piano. Vaucanson built a flute-player which moved his fingers and lips, and played several tunes correctly; and a duck which fed and digested its food. Yet these men spent the better part of their lives upon the attempt to discover the Perpetual Motion.

A CHEMICAL PERPETUAL MOTION.

Though no philosopher nor intelligent mechanic now believes in a purely mechanical perpetual motion, a good many are still befogged among the combinations of chemistry. Even Lyell, as Thompson shows,* has not got his head clear about the impossibility of any machinery creating or sustaining force. The nature of chemical combinations is so occult, their emergencies so constant, and their power so enormous, and their recent applications in the telegraph so far-reaching and astonishing, that some are ready to hope and believe that the long-sought Perpetual Motion may lie hidden away among them. By combining chemical with mechanical motions may we not somehow make a machine which shall create power? In Germany a factory having a surplus of water-power uses it to rotate two iron plates against each other, and

* *Annual of Scientific Discovery*, 1864, p. 210.

the friction produces heat enough to warm the room. Now could not this heat be employed to run a small steam engine, which in its turn would rotate other plates, and so create its own fuel? Could we not go on and multiply such arrangements *ad infinitum?* Until recently nobody could scientifically demonstrate the impracticability of such a notion.

A more complicated form of the machine makes use of the rotation to produce heat, not directly by friction, but indirectly by electro-magnetism. The whole industrial world was set in a high state of excitement about thirty years ago by an American inventor of an electro-magnetic Perpetual Motion. By causing the magnet to revolve with great velocity, powerful currents of electricity are obtained, which when conducted through water reduce it into its two components, oxygen and hydrogen. By the combustion of hydrogen water is again generated. If this combustion takes place, not in common air, of which oxygen only constitutes one fifth part, but in pure oxygen, and if a piece of chalk be placed in the flame, the chalk will be raised to a white heat, and will give us the brilliant Drummond light, with an intense heat. Now our inventor proposed to drive a small steam engine with this heat, which, in its turn, would keep the magnet revolving. We should thus have a machine which made its own fuel, and, moreover, generated light, heat, and electricity, and kept itself and all its operations in motion perpetually. At that time the progress of physical science among the people, or even among the students of special branches of science, did not enable them to perceive the impossibility of this arrangement. They did not know but that there might somehow be found a combination of chemical, electrical, magnetic and mechanical processes, which could generate power, or at least multiply the original force needed to

cause the first rotation of the magnet, and so we could find our perpetual motion. The great law of the Correlation of Forces was not known to the most, even of the learned, until Tyndall expounded it. They knew in a general way that motion can be converted into heat; as a cannon ball when it strikes against an iron plate becomes hot, and the Indian kindles fire by rubbing two sticks together, or the blacksmith heats his nail-rod red-hot with a dozen smart blows. But they did not know that the amount of heat thus produced is always exactly equal to the amount of motion expended on its production, no more, no less; so that thus we gain no power in changing mechanical motion into heat, or the reverse. On the contrary, we always lose something by friction in our machines, and sometimes we lose a great deal. Our best steam engines, for instance, give us only twenty per cent. of the actual heat-power of the coal we burn under them. So again in the case of the conversion of motion into electro magnetism, the electric processes are exactly equal to the power used to produce them. Neither do we create or increase power by changing chemical into magnetic force. We may change our gold dollars into silver dimes, or into nickels, or into copper cents, or into greenbacks; or we may reverse the process, or change the operation by getting bonds for greenbacks, or silver for coppers, but we can never get more than a hundred cents for our dollar, and we seldom get so much, after we have paid our brokerage. I can not here enter on the proof of this fact. It is demonstrated at large by Helmholtz, by Joule, and Tyndall, and accepted by all students of the physical sciences. You will find it expounded in the *American Cyclopædia*, article, Heat; which states the fact that a weight of 772 pounds falling one foot, will raise the temperature of a pound of water one degree of Fahrenheit's thermometer. The power of the steam thus

produced is exactly equal to raising 772 pounds one foot high. So with all the other modes of motion; there is no gain of power in converting motion into electricity, or magnetism, or light, or chemical action. Neither by chemistry nor by mechanics can we generate power or increase it. Action and reaction, throughout the whole realm of the forces of matter, are equal.

MACHINERY CANNOT CREATE POWER.

Now, the result of the application of this great principle to the Nebular Hypothesis is to demonstrate that whatever force was in the universe at the time of its beginning, be it much or little, has not increased one pound-foot since, by any action of *its own*. Whether it operated as gravitation, or motion, or heat, or chemical combination, or any other force, it could not *create* any addition to its power by any mechanical or chemical process whatever. A chemical machine, or an electro-magnetic machine, could no more create power than a steam engine, or a water-mill, or a clock; and, consequently, this nebular machine is as impotent to originate motion, or to sustain a Perpetual Motion, as any bottle model ever exhibited by a showman. When you examine it closely, it is moved by some outside power. The doctrine of the Correlation of Forces, by demonstrating, that not only the force of gravitation, but all the other forces of matter as well, are under the same law of God wherever matter extends, demonstrates the impossibility of the creation of force by any form of machinery, either in the heavens or the earth; and the consequent impossibility of the creation of force by that form of the Perpetual Motion notion, known as the Nebular Hypothesis.

Our nebular development men, however, have not yet got beyond this vulgar superstition of the creation of power by machinery. Their Perpetual Motion, indeed,

is somewhat far away in the heavens, but mechanical principles are just the same in the sun or the nebulæ as in any machine-shop in London or New York. It is true they make their machine, not out of cast iron or melted brass, but out of these metals and others melted into gas; but that makes no difference in the principle of the thing, for still it is only a machine. Nor does the size of the machine at all alter the nature of the arrangement; whether you make your wheels as small as those of a watch, or as large as the orbit of Saturn, the machine can not create power, and the Perpetual Motion is impossible. The Nebular Hypothesis is simply the notion of a machine to create power, and, as such, must be instantly rejected by every intelligent mechanic.

But our men of books are not nearly so intelligent in planning machines as good practical mechanics. Mr. Spencer, for instance, informs the world, from artillery officers down to boys whipping tops, that, "The mechanical equilibrium [of the Solar System] would not have been at all interfered with had the sun been without any rotary movement."* In another place, he tells us that this development theory "works after a method quite different from that of human mechanics." Quite so, we should say. In all human projectiles rotation has everything to do with equilibrium; therefore it is necessary to show scientists the precise location of their absurdity in this theory.

It lies in the notion that gravitation can either originate or sustain a Perpetual Motion. What is gravitation? It is the attraction of every particle of matter in the universe for every other, operating equally in all directions, directly as the mass, and inversely as the squares of the distances. Now, granting the atheist's assumption of a universe full of equally diffused homogeneous

* *Illustrations of Universal Progress*, 264.

nebulous matter, what will happen? Why, nothing will happen. There is an infinite attraction in every direction, operating equally on every particle of matter in the universe; and so no motion can begin, for motion is not the result of equilibrium, but of the destruction of equilibrium of force. So long as the attraction operating upon every particle of matter in the universe is equal in every direction, no particle will move a hair's breadth. Why should it? How can it? The attraction of gravitation, under such circumstances, would be like a gum-elastic cord stretched between two pins: so long as the pins are held fast the attraction of elasticity causes no motion; you must let go at one end to cause motion; but in an atheistic universe there is nobody to let go! Here is an atom which is invited to start on a visit to its near neighbor on the right hand, and is very much inclined to go, but it has at the same moment an equally urgent invitation from its neighbor on the left, and so being equally unwilling to disoblige Mrs. Right by going to Mrs. Left's party, or to offend Mrs. Left by going to Mrs. Right's party, it exerts a masterly inactivity, and stays at home. Every other atom being endowed with an equal impartiality we can have no motion under the law of equal attraction.

Nor will any law of equal repulsion originate motion; nor can any form of impersonal force destroy an eternal equilibrium; for in a universe full of diffused homogeneous matter, all other forces—heat, electro-magnetism, chemical power, etc.,—are, by the hypothesis, as equally diffused as gravitation, and so operating with equal force in every direction. Their action and reaction are equal. Their repulsions can no more originate motion under such circumstances, though they push to eternity, than the boy sitting in the wheelbarrow can move it by pushing against the front-board. No power *in* the mass can move it. The power must come from the outside; but

an infinite mass has no outside. Give Archimedes a place on which to rest his lever, and he could move the world; but there is not a foot left him outside of an infinite universe; and inside it has not the most distant idea of revolution. It may be full of the most energetic forces, every inch of it may contain thunders capable of tearing the heavens to atoms, but then every other inch is equally powerful, and all are therefore agreed to maintain the balance of power.

La Place, more astute than his more modern disciples, perceived this, and did not claim an infinite universe full of homogeneous, nebulous matter. He was content to ask only a globular mass big enough to make the Solar System; but he stipulated that it must be at a white heat, and placed in space a great deal cooler than itself from eternity, and that it should keep cooling to produce the motion he desired.

This, it will be perceived, introduces new conditions and forces into the problem. The matter is no longer infinite but limited; and this limited piece of matter is at a different temperature from the infinite space which contains it. Now, what reason can be given why this particular part of infinite space should have a lump of matter in it, and all the rest be empty? Why should this lump of matter become so outrageously out of keeping with its location as to be at a white heat, while the space which contains it is several hundred degrees below the freezing point? How did it work itself into such a heat? Where did it get the coals? Who kindled such a fire? And how is the supply of fuel to be perpetually kept up, to keep our perpetual motion going? Suppose we overlook all the difficulties of the original creation of such a machine, and give it to our evolutionists all ready, constructed, and set in motion—how much nearer are we to the perpetual motion than before? Not one inch. A

universe full of homogeneous matter can not originate any motion; and a universe half full can not perpetuate the motion imparted to it. It is true that by giving us a limited lump of matter we obtain motion by the attraction of gravitation; but then this is a limited supply of motion, and so must find its limit, and come to an end, by the very necessity of the case. A limited universe can not sustain an eternal motion. Grant the power to start the machine, or, if you please, half a dozen powers—gravitation, heat, electro-magnetism, chemical action—will a limited machine keep running to eternity? For, observe, this is the imperative demand, and indispensable to get rid of a Creator outside of the machine, that we must have *eternal* matter, and *eternal* motion. A beginning of any kind, either of matter or of motion, is fatal to atheism. The motion must have begun from eternity, if the matter be eternal, and the laws of matter be eternal; else it could never have begun since, by those laws; and he must have a machine which has kept running from eternity upon a limited supply of force. But no matter how enormous you make the original supply, and how slow you make the expenditure, it must be exhausted in an eternity of time. The coals under the boiler will burn out, and the fire must die, and the white-hot nebula must cool down to the same temperature as the space around it, and then, by Carnot's law (which declares that heat is only active when passing from a body at one temperature to one of a different temperature), all motion derived from it must cease within a limited time. Millenniums ago all motion must have ceased; for, remember, the atheist's mass of matter has been cooling from all eternity, and therefore all its heat power must have long since expired. No perpetual motion can be maintained by a world limited either in space or time.

You can not obtain a centre of gravity, to become a

centre of attraction, without giving boundaries to your universe; but by thus giving it boundaries, and a centre, you insure the certain accumulation of all its parts in one great heap around this centre. If you say that matter meets no resistance in moving through space in obedience to gravitation, then it will all rush in right lines to the one vast heap, in which sun, moon, stars, and planets will be embedded in an eternal rest. If on the other hand you say, as La Place assumes, that it meets with a resisting medium, the result is the same, only somewhat delayed; matter takes a spiral instead of a direct track; and as Comte shows, arguing from the yearly decreasing orbit of Encke's comet, our planets must fall into the sun, and our sun, and all other suns, into the centre of the whole system. If this progress were only an inch in a million years, but proceeding from eternity, unutterable ages ago the whole finite universe had reached a state of perpetual rest.

That eternal motion, then, which the nebular hypothesis assumes as its source of power, is contrary to the first principles of mechanics. Motion must have originated *outside* of the great world-machine.

IS NEBULOUS MATTER HOMOGENEOUS?

We have seen that motion could not originate in an eternal universe full of homogeneous matter; and that it could not be perpetuated in a universe half full, or part full. In the first case, it could not possibly begin. In the second, it must exhaust itself long before eternity was as far spent as it is at present. The world can neither start, nor continue, eternal motion.

As it regards the other fundamental assumption of the Nebular Theory, that all space was originally full of eternal homogeneous nebulous matter, the latest discoveries of science demonstrate that there is no such matter in the known universe, either in earth or heaven.

This could not be proved at the time of the invention of this hypothesis; nor was it supposed that negative proof could ever be discovered. Its possibility was not suspected by the reconstructors of the theory a few years ago. As we have seen, so lately as 1865, Lesley boasted that no negative proof of the existence of such matter in the nebulæ could ever be adduced. The nebulæ were so many millions of miles away that it was deemed perfectly safe to assert the existence of any absurdity in them; for nobody ever dreamed of angels of God descending from them upon the sons of men, to contradict the atheist's assertion, of the existence there of eternal homogeneous matter. The eternity of such matter was, therefore, boldly asserted as an ascertained, indisputable fact.

Thus, for instance, the State Geologist of Illinois: "We can conceive of no time in the past when the material which constitutes the earth did not exist in some form, and we can conceive of no period when it will not exist. . . . Hence, to our finite conceptions, the matter which constitutes the material universe is eternal, and can no more be annihilated than that Infinite Spirit which pervades all things, and which we recognize as God."* The Geologist had no right to use the plural number, and to assume that all the legislature of Illinois recognize any such pantheistic partner of eternal matter as their God. Tyndall is equally explicit in denying any beginning. "The law of conservation rigidly excludes both creation and annihilation."† These men did not imagine that within a few years science would demonstrate their errors.

The *homogeneousness*, or absolute *uniformity*, of this eternal matter, in all its qualities, is equally essential to their system, and is with equal confidence assumed, without, however, the shadow of proof. Thus

* *Geological Survey of Illinois*, 1-11.

† *Annual of Scientific Discovery*, 1864, 79.

Lesley says: "Grant its one postulate, that space was originally full of homogeneous matter, obedient to the laws of physics," etc.* The homogeneousness of the original matter is the very basis of Spencer's theory of evolution. "From the earliest traceable cosmical changes down to the latest results of civilization, we shall find that the transformation of the homogeneous into the heterogeneous is that in which progress essentially consists."† So also the editors of the *American Cyclopædia* state the theory, "Assuming for the sake of the argument, a rare, homogeneous, nebulous matter, widely diffused," etc.

WHAT COULD BE DONE WITH SUCH MATTER?

Suppose that in his travels and investigations, our atheist should happen upon a mass of homogeneous matter, somewhere; what could be made out of it by the laws of physics? It could never make anything out of itself, but itself; for no chemical changes ever arise till substances of different materials come together in contact, or operate on each other. The law of gravitation might make the lump contract, and become a smaller lump, but it would not make it a lump of different materials from what it was before. The law of gravitation might make it contract, but we have no reason to believe that the contraction of a homogeneous mass could produce any magnetic or electric currents; at least, no simple element ever produces any such electric action in our world. Our atheist can do nothing with it but knead it out into as many shapes as he pleases, but he can never get out of it what is not in it. He may amuse himself molding his nebula, like a boy kneading a lump of putty; he may bake it up into balls, or flatten it into cakes, or punch it out into rings, if he pleases; or he may soften it at the

* *Man's Origin and Destiny*, 25.
† *Illustrations of Universal Progress*, 3.

fire, if he has a fire, or allow it to harden in the air; but he can never make it into a loaf of bread, or a piece of soap, or a plate of ice cream. He will never make his putty into an apple, or a beefsteak; simply because there is no apple or beefsteak in it, and no amount of kneading, or baking, or boiling, will enable you to get out of it what is not in it. Neither chemistry, nor electricity, nor gravity, nor any other power or law known to man, can make a simple substance compound, in any other way than by adding another substance to it; when it ceases to be a homogeneous substance, and becomes heterogeneous. Then, when you have two elements, and action and reaction begin, you may compound them; but a homogeneous substance admits of no changes of substance; the only changes possible in homogeneous matter are changes of form. If, then, our atheist had ever so much homogeneous matter, and all the heat and force he desires, he could never make a heterogeneous world out of it, much less a world composed like ours of nearly seventy different substances. If there is only one kind of gas in his nebula, he can never make it into two by any kind of conjuring with the laws of physics; for the laws of physics can no more create matter, than the laws of machinery can create motion. Indeed, our Evolutionists stoutly deny the possibility of the creation of anything, either matter or force. If this homogeneous nebula is acid, it can never become alkaline by any possible action of its own. No such heterogeneous world as we inhabit could ever be produced from a homogeneous substance. If the world was made out of a nebula, that nebula must have contained in it all the elements of the world, and so was not a homogeneous, but a heterogeneous nebula. A homogeneous nebula would be a very useless substance for this purpose.

It may seem strange that men should so boldly assume

the existence of a substance so utterly unlike a natural production known to man, and whose existence could not be supported either by reason or analogy. For it is undeniable that

NO HOMOGENEOUS SUBSTANCE HAS EVER BEEN FOUND

in nature; everything we know in its natural state is compound. The stones are compacted of grains of sand, the grains of sand are combinations of smaller crystals, the crystals are chemical combinations of acids, alkalies, and metals, and each of these in its turn, so far as we can analyze it, is also a compound. The water we drink is a compound of two gases and of several minerals, and the air we breathe consists of even a greater number of ingredients—a perfect stirabout of matters, Tyndall says. This world, so far as we know it, is built up out of at least sixty-seven heterogeneous elements; and every year another is added to our knowledge. Many of these elements not only have no resemblance to each other, but are as dissimilar and antagonistic as possible—gases, metals, acids, alkalies—yet out of the combination of such heterogeneous materials this world is made. Even when we separate these simple elements by chemical means, we can not keep them separate, by all our skill. The chemist knows that he can not keep any gas absolutely pure for five minutes in any vessel he can devise, and not one instant if he leaves it free to mingle with the earth, air, or water. How, then, did these theorists come to dream of a natural condition of matter of which we not only have no example, but which we can not even conceive possible, in a state of nature? It was indispensable to their atheism; since the combination of heterogeneous matter argues a great combiner, and so proves the existence of a God.

Common sense refuses to believe the eternity of compound or combined substances. We instinctively believe

that the elements preceded the combination. You find on the street two laths connected by a nail; no sophistry can persuade you that this is the original state of these laths; nor yet that they ran about town to find each other, and then that the two laths jointly set out in search of a nail, and having found one of suitable size, that either the nail by means of the law of mechanics drove itself into the laths, or that the laths by means of the power of attraction sucked in the nail. The merest child at once infers the agency of some person to bring the laths together, and to drive the nail, to accomplish some purpose which he had in his mind. So, if you find a house built of several courses of brick, cemented together with mortar, you inevitably conclude that it was not there from eternity, but that it was built by some person who brought the brick together, and made the mortar, and laid the brick in their proper places, and cemented them with the mortar, with the design of building such a house. But let us go a step farther back. Here is a brick which we find lying on the street; may not that brick have existed there from all eternity, since we are told that matter is eternal? Though we have seen combinations of matter can not be eternal, yet this brick looks to us a very simple affair. Let us, however, look at it with the microscope, and we shall find that it is built up of several millions of little bricks, cemented together by the art of the brickmaker; and so the brick compounded of these millions of little bricks, these particles of sand and clay, proves the agency of a brickmaker, by its composition. But now let us go another step farther back, and behind the range of man's operations, take these little bricks and ask, May not they have existed from eternity in their present shape, until man laid hold on them and moulded them to his use? No! before man had manufactured them, another manufacturer had been at work

on them. Each of these little bricks is compounded of from ten to thirty-seven ingredients—silex, aluminum, magnesia, iron, oxygen, hydrogen, nitrogen, and if your brick be from Philadelphia or from California, gold enough to gild the front of it as bright as a new dollar. The little bricks, then, no less than the larger brick, attest some outside influence to combine all these elements; and, inasmuch as the combinations are more delicate and difficult and numerous, give us even greater certainty that it did not make itself. We can not get rid then of the evidences of combination and purpose by breaking up our large brick into smaller bricks. They, too, testify a Creator, for

NOTHING COMBINED OR COMPOUNDED IS ETERNAL.

But our atheists have learned the power of fire to dissolve matters put into it, and a bright idea strikes them: "Could we not throw these little bricks into the fire, and make it hot enough to convert them into gas or flames? We can allege that these flames are homogeneous substances which give no proof of a Creator by their combinations, and so may be eternal, because they are absolutely simple and homogeneous. If we locate them a great many millions of miles away in the heavens, nobody will ever be able to go there to prove the contrary. Then, out of this homogeneous nebulous matter, we can manufacture the world, simply by the laws of physics, and without the need of a Creator. We can then confidently allege that the nebulæ in the distant heavens are the remainders of such homogeneous matter out of which our Solar System was made."

Before the discoveries of Kirchhoff and Bunsen in 1859 nobody could say but that possibly some such bodies were among the nebulæ which had excited so much attention. It was not very likely, still it might be possible. Astronomers

generally, finding that better telescopes resolved many of these clouds into clusters of stars, very small and very closely crowded, inclined to believe that they would all ultimately prove resolvable; and so, that we had no proof of the existence of any nebulæ at all. In that case we should have been obliged to allow the possibility of homogeneous nebulæ as a mere intellectual conception, uncontradicted by any known facts. The astronomers who used Lord Rosse's great telescope at Armagh, then the largest in the world, emphatically denied the existence of nebulæ at all; and in some tracts written at that time, we quoted their testimony. But it now appears that they were too hasty in applying to all the nebulæ in the heavens the facts which they had discerned in those twenty or thirty which they had examined. Their facts were correct, but their logic was erroneous. They assumed sameness in the constitution of the heavens, and reasoned on that assumption; but there is no more uniformity in heaven than on earth. Variety is the law of heaven, and the reasoning based on the contrary assumption was erroneous. The denial of true nebulæ by Lord Rosse, Nichol, and others, adds another instance to the list of proofs of the fallibility of the best astronomers and telescopes.

THE REVELATIONS OF THE SPECTROSCOPE.

A curious instrument has now been invented, which enables us not only to magnify distant objects so that we can see their outside better, but which opens windows into flames, and enables us to see their inside, and which tells of what they are made. By applying this instrument to the nebulæ, we discover that they are of various kinds; some are hosts of small stars, perhaps like our planetoids in bulk; others are clouds of gas. A series of discoveries has been made in the distant heavens, which

not only establishes the fact of the existence of some nebulæ as clouds of flames, but which also reveals to us their nature as *compound* substances, and thereby explodes the last fortress of the atheistic dogma of the Eternity of Matter. Here, also, the progress of true science removes the stumbling-blocks which conceited ignorance throws in the way of religion. As the discovery of the principle of the Correlation of Forces has utterly swept away the last vestige of faith in eternal motion, so this other recent discovery of science has enabled us to refute the notion of the eternity of matter, to see the constitution of the most distant stars, to dissect the flames of the nebulæ, to tell the chemical ingredients combined in them, and thus has demonstrated the non-existence in them of any such homogeneous matter as the atheistic theory asserts. From which the consequence is irresistible, that as no homogeneous matter manifests its existence in heaven or in earth, all matter is *compound*, and therefore not eternal. This great achievement has been effected by the spectroscope, an instrument which enables us to analyze the light of the most distant nebulæ, and from the spectra which it casts, to read their chemical constitution far more accurately than if we could bottle the gas and analyze it in our laboratories.

As this discovery is of great value in disproving the existence of homogeneous matter, we proceed to give a brief account of

SPECTRUM ANALYSIS.

The spectrum is the magnified image of a ray of light, expanded like an opened fan, and thrown upon a screen. It displays the red, orange, yellow, blue, and violet colors which lie folded up in a ray of white light, but which are spread out when the ray is passed through a prism. The spectroscope is an arrangement of prisms and telescopes, enabling us accurately to observe and

measure the various parts of the spectrum. Long ago Frauenhofer observed that in the solar spectrum the band of colored light was not absolutely continuous, but was crossed by a system of lines, which he marked B, C, D, E, F, G, H; which have since been called Frauenhofer's lines, but of which he knew not the significance. Bunsen and Kirchoff, on further investigating this matter, found that the Drummond light, when surrounded by burning gas, gave out another system of lines; and that different gases gave different systems, according to their constitution, or to the different metals burned in their flames; one metal showing one set of lines in one part of the spectrum, another a different set in another part; and that each mineral gives lines of its own peculiar color. Thus, for instance, the sodium in common salt gives a bright, distinct, yellow line; lithium a pale yellow, and a bright red line; while strontium gives a band of six red, one orange, and one blue. The very smallest quantities of these metals present in the atmosphere are easily discovered by the spectroscope, and several new metals, never known before, have been discovered by it. The six-hundred-thousandth part of a millogramme of strontium, in the dust of a room where spectrum experiments were in progress was distinctly displayed upon the spectrum of the gaseous flame.* But while a gaseous flame gives bright lines in the spectrum, the sun gives dark lines. We can not, of course, distinguish these by their colors, but we may by their number and position. Thus, we find in the spectrum of the sun's rays the lines peculiar to iron, about seventy well-marked lines between the Frauenhofer lines D and F, and conclude that iron exists in the sun; since all the bright lines of the iron spectrum in gas correspond to the dark lines in the sun's spectrum. The two bright yellow

* *Annual of Scientific Discovery*, 1862, p. 137.

sodium lines are coincident with two dark lines in the solar spectrum: and the bright red line of potassium coincides exactly with a dark line of the same breadth. Thus, we discover in the sun, iron, calcium, magnesium, sodium, aluminum, nickel, barium and copper. The sunlight reflected from the planets gives the same system of lines; but the fixed stars give each a different system, showing the presence of different metals in each. Thus we are enabled to discover, not only whether a ray of light comes from a solid coal or from a flame of gas, but we can also tell of what gas the flame consists. Mr. Huggins thus describes

THE VARIOUS ORDERS OF SPECTRA:

"When light which has emanated from various sources is decomposed by a prism, the spectra which are obtained may differ in several important respects from each other. All the spectra which may present themselves may be conveniently arranged in three groups.

"1. The special character which distinguishes spectra of the first order consists, in that the continuity of the colored band is unbroken by dark or bright lines. We learn from such a spectrum that the light has been emitted by an opaque body, and, almost certainly, in the solid or liquid state. A spectrum of this order gives us no knowledge of the chemical nature of the incandescent body from which the light comes.

"2. Spectra of the second order are very different. These consist of colored lines of light separated from each other. From such a spectrum we may learn much. It informs us that the luminous matter from which the light comes, is in the state of gas. It is only when a luminous body is free from the molecular trammels of liquidity and solidity that it can exhibit its own peculiar power of radiating some colored rays alone. Hence,

substances when in a state of gas may be distinguished from each other by their spectra. Each element, and every compound body that can become luminous in the gaseous state without suffering decomposition, is distinguished by a group of lines peculiar to itself.

"3. The third order consists of the spectra of incandescent solid or liquid bodies, in which the continuity of light is broken by dark lines. These dark spaces are not produced by the source of the light. They tell us of vapors through which the light has passed on its way, and which have robbed the light by absorption of certain definite colors or rates of vibration. Such spectra are formed by the light of the sun and stars.

"Kirchoff has shown that if vapors of terrestrial substances come between the eye and an incandescent body, they cause groups of dark lines; and further, that the group of dark lines produced by each vapor is identical in the number of the lines, and their position in the spectrum, with the groups of bright lines of which its light consists when the vapor is luminous.

"It is evident that Kirchoff, by means of this discovery, has furnished us with the means of interpreting the dark lines of the solar spectrum. When a group of bright lines coincides with a similar group of dark lines, then we know that the terrestrial substance producing the bright lines is present in the atmosphere of the sun; for it is this substance, and this substance alone, which, by its own peculiar power of absorption, can produce that peculiar group of lines. In this way Kirchoff discovered the presence of several terrestrial elements in the solar atmosphere."*

The result of these investigations of the sun, stars, and nebulæ is, that they are all composed of several

* *Lecture before the British Association*, Nottingham, August 23, 1866, by W. Huggins, F. R. S.

elements, some of which are earthly, others unearthly, and that they are widely different in their chemical compositions. Not only do the nebulæ differ from the stars in being in a different mechanical condition through heat, as if they might be stars burned up into gas retaining all the elements of stars; they present radical differences of chemical composition, such as could by no means originate in any change of temperature. The stars also differ from each other in the same remarkable way; they are all composed of several elements, and differ in the elements of which they are composed. There is

NOT A TRACE OF HOMOGENEOUS MATTER,

containing only one simple uncompounded element, in the heavens, neither in the original nebulæ, nor in the suns and stars which were said to be composed of it.

The remarkable difference in the material of the stars overthrows the notion of their homogeneous origin. It is thus stated, and its undeniable consequence drawn with emphasis, by Mr. Rutherford of New York, one of the highest authorities on Spectrum Analysis; "The star spectra present such varieties that it is difficult to point out any mode of classification. For the present, I divide them into three groups: first, those having many lines and bands, and most nearly resembling the sun; viz., Capella, β Geminorum, α Orionis, Aldebaran, γ Leonis, Arcturus, and β Pegasi. These are all reddish or golden stars. The second group, of which Sirius is the type, present spectra wholly unlike that of the sun, and are white stars. The third group, comprising α Virginis, Rigel, etc., are also white stars, but show no lines—perhaps they contain no mineral substance, or are incandescent without flame.

"It is not my intention to hazard any conjectures based upon the foregoing observation; this is more properly

the province of the chemist; and a great accumulation of accurate data should be obtained before making the daring attempt to proclaim any of the constituent elements of the stars.

"One thought I can not forbear suggesting. We have long known that 'one star differeth from another star in glory;'* we have now the strongest evidence that they also differ in constituent materials, some of them perhaps having no elements to be found in some others. What, then, becomes of that homogeneity of original diffuse matter which is almost a logical necessity of the Nebular Hypothesis?"†

THE CONSTITUTION OF THE NEBULÆ.

Of the constitution of the nebulæ, William Huggins of London, the leading spectroscopist, says:

"The telescope has failed to give any certain information of the nature of the nebulæ. It is true that each successive increase of aperture has resolved more of these objects into bright points; but, at the same time, other fainter nebulæ have been brought into view, and fantastic wisps, and diffused patches of light have been seen which the mind almost refuses to believe can be due to the united glare of innumerable suns still more remote.

"Spectrum analysis, if it could be successfully applied to objects so excessively faint, was obviously a method of investigation specially suitable for determining whether any essential physical distinction separates the nebulæ from the stars.

. . . . . .

"I selected, for the first attempt, in August, 1864, one of the class of small but comparatively bright nebulæ. My surprise was very great, on looking into the small

*1 Cor. xv. 41.

†*Annual of Scientific Discovery*, 1865, p. 331.

telescope of the spectrum apparatus, to perceive that there was no appearance of a band of colored light, such as a star would give: but in place of this, there were three isolated bright lines only.

"This observation was sufficient to solve the long-agitated inquiry, in reference to this object at least, and to show that it was not a group of stars, but a true nebula. A spectrum of this character, so far as our knowledge at present extends, can be produced only by light which has emanated from matter in a state of gas. The light of this nebula, therefore, was not emitted from incandescent solid or liquid matter, as is the light of the sun or stars, but from glowing or luminous gas.

"It was of importance to learn, if possible, from the position of these bright lines, the chemical nature of the gas, or gases of which this nebula consists. Measures taken by the micrometer of the most brilliant of the bright lines showed that this line occurs in the spectrum very nearly in the position of the brightest of the lines in the spectrum of nitrogen. The experiment was then made of comparing the spectrum of nitrogen directly with the bright lines of the nebula, I found that the brightest of the lines of the nebula coincided with the strongest of the group of lines which are peculiar to nitrogen. . . . . In a similar manner the faintest of the lines was found to coincide with the green line of hydrogen. The middle line of the three lines which form the spectrum of the nebula does not coincide with any strong line of the spectra of about thirty terrestrial elements. It is not far from the line of barium, but does not coincide with it." *

Mr. Huggins examined about sixty of these bodies, with similar results. About one third were found to be true nebulæ, presenting, some three, others two, and two

* *Lecture before the Royal Institution*, 1866.

only one line. The significance of this discovery is immense. The existence of any true continuous flame of gas shows combustion, and thus in the case of the nebula with only one visible line, gives us the elements of a multitude of combinations. In the other cases a variety of the elements of chemical combinations are plainly visible in the spectrum. The notion, then, of any homogeneous nebulous matter existing in the heavens is contradicted. Those flames in the heavens are no more composed of homogeneous matter than the flames of your gaslight or of your wood-fire. Mr. Huggins adds: "The light from the nebulæ emanates from intensely heated matter in the form of gas. It is probable that two of the constituents of these nebulæ are the elements hydrogen and nitrogen, unless the absence of the other lines of the spectrum of nitrogen indicates a form of matter more elementary than nitrogen. The third gaseous substance is at present unrecognized.

"The uniformity and extreme simplicity of the spectra of all the nebulæ oppose the opinion that this gaseous matter represents the 'nebulous fluid' suggested by Sir. William Herschel, out of which the stars are elaborated by a process of subsidence and condensation. In such a primordial fluid all the elements entering into the composition of stars should be found. If these existed in these nebulæ, the spectra of their light would be as crowded with bright lines as the stellar spectra are with dark lines." *

So it appears that the nebulæ will not suit the purpose of the theory in any possible way. They are neither the heterogeneous materials out of which existing worlds are made, nor yet the simple uncompounded substance which would enable the atheist to assume the eternity of matter.

Such is the fate of all human cosmogonies. They are

* *Lecture before the Royal Institution*, 1866.

the reflection of the imperfect science of their day, embodying its ignorances as well as its knowledge. Science advances and exposes these ignorances, and the science of one generation becomes the sport of the next. Nevertheless, men will keep on world-making, for there is nothing man so dearly desires as to be as gods, and every generation fancies it has achieved this perfection. So men will keep showing us how this world, as they see it, was made.

MOSES MADE NO SUCH SCIENTIFIC BLUNDERS.

The Biblical account alone indulges in none of the blundering explanations of human science. How is this? Was Moses not a man of like passions with La Place, and Comte, and Herschel, and Spencer? Was he not as dearly in love with cosmogony as they? Why, then, did he not indulge in some astronomical disquisitions, and blunder a little for the edification of his successors, like the rest? Evidently it was not a sense of ignorance which restrained him. "A writer of that ancient date who could distinguish between the presence of light and the presence of the sun; who could relegate the first appearance of the sun, as an influence on the earth, to a period coinciding with that of the appearance of the seasoning in plants; who could place man as the last product of creation, separating him and his own will altogether from any share in the production of inferior animals, and allotting to him so exactly the place which he fills, and the lordship which he holds; who could distinctly enunciate the fact of the present Sabbath of creation, the fact that, since the appearance of man upon the earth, no further act of creation has been wrought upon its surface, must, even common sense allows it, have received his revelation of the Creator's purpose (whether by vision, or in allegory, or by direct dictation, except as

a matter of curiosity concerns us not) from some external source to which the secrets of creation, and the mysterious processes of life were clearly and intimately known."*

Certainly the cosmogony which contains so many mysteries, all unknown to the science of Moses' day, but fully confirmed by the revelations of the ages, should command respect from men acquainted with the blunders of their predecessors and colleagues in that line. They should be convinced that its author was superhuman, and its science divine. At least they should cease from degrading it by speaking of it in the same breath with the Nebular Hypothesis—which is incompatible with the facts of science, both in its original and corrected edition.

Mr Huggins gives it as his opinion that, "the nebulæ possess a structure and purpose in relation to the universe alogether distinct from the great cosmical masses to which the sun and fixed stars belong." Whether this be physically the case or not, it is evident that they have answered a great moral purpose, unaccomplished by the other heavenly bodies: they have been appealed to, to demonstrate the existence of homogeneous eternal matter which might exist without a Creator; but they have in the fullness of time shone forth with a demonstration of their composite constitution, alleging undeniably the agency of the same great Combiner and Creator who arranged all the rest of the creation according to weight and measure, in forms of light, and beauty, and order.

Thus, now as ever, and in their most distant recesses, "the heavens declare the glory of God, and the firmament showeth his handiwork." The marks of combination, and arrangement, and adaptation for a purpose, and wise construction, appear on every substance in heaven or on earth. His eternal power and Godhead are seen by the

* *Essays on Questions of the Day.* Longman, London, 1866, p. 287.

works he has made. He alone is eternal. All else bears the marks of a beginning, and declares its inability to originate its elements, or to combine them in their present arrangement. Science demonstrates that neither matter nor motion can be eternal, nor infinite; and therefore that any attempt to erect an atheistic cosmogony on this assumption must be absurd.

SEVEN WORLD-PROBLEMS.

"True learning will do homage to revelation. Not long ago, Dr. Emil du Bois Raymond, an eminently learned and able scholar, and the foremost opponent of materialism and scientific atheism in Germany, published an essay on 'The Limits of Natural Philosophy,' in which he showed that its researches are restricted to what is cognizable by the senses, and that beyond these bounds, which science can not pass, the guidance of faith is a necessity. His essay produced quite a sensation; to which he has recently added by a second essay before the Berlin Academy of Science, in which he enunciates to his brother scientists seven world-problems which no one of them has been able to solve: 1. The existence of matter and of power. 2. The source of motion. 3. The beginning of life. 4. The manifest proofs of design in nature. 5. The origin of simple perception. 6. Logical thinking, and the origin of language. 7. Free will. Believe in God, and all these problems are readily solved. Ignore the Creator, and the demands made on your credulity are numerous and some of them stupendous." *

Homogeneous, gaseous matter has been separated, investigated and found to bear the Creator's mark. Science has penetrated even into the constitution of matter, and from the constitution of its smallest parts, the molecules

* *Baptist Weekly.*

of which each element is composed, it has demonstrated the necessity for, and the proof of, the existence of a Maker.

THE ULTIMATE MOLECULES OF MATTER ARE MADE,

manufactured, and bear the manufacturer's brand indelibly stamped upon each one of them. Allow me to cite the words of one whose name will ensure respect from all scientists—Prof. James Clerk Maxwell, in his lecture before the British Association as given in the *Scientific American*, and cited in the *Interior*, Sept. 4, 1873:

"Professor Clerk Maxwell lately delivered an interesting lecture before the British Association upon Molecules, by which is meant the subdivision of matter into the greatest possible number of portions, similar to each other. Thus, if a number of molecules of water are combined, they form a mass of water. Molecules of some compound substances may be subdivided into their component substances. Thus the molecule of water separates into two molecules of hydrogen and one of oxygen.

"Professor Maxwell has calculated the size and weight of hydrogen molecules, and finds that about two millions of them, placed side by side in a row, would occupy a length of about one twenty-fifth of an inch, and that a package of them, containing a million million million million of them, would weigh sixty-two grains, or not quite one-eighth of an ounce.

"Each molecule throughout the universe, bears impressed on it the stamp of a metric system as distinctly as does the meter of the archives at Paris, or the double royal cubit of the Temple of Karnac.

"No theory of evolution can be formed to account for the similarity of molecules, for evolution necessarily implies continuous change, and the molecule is incapable of growth or decay, of generation or destruction. None of

the processes of nature, since the time when nature began, have produced the slightest difference in the properties of any molecule. We are therefore unable to ascribe either the existence of the molecules or the identity of their properties to the molecules, or the identity of their properties to the operation of any of the causes which we call natural. On the other hand, the exact equality of each molecule to all others of the same kind gives it, as Sir John Herschel has well said, the essential character of a manufactured article, and precludes the idea of its being eternal and self-existent.

"Thus we have been led, along a strictly scientific path, very near to the point at which science must stop. Not that science is debarred from studying the internal mechanism of a molecule which she can not take to pieces, any more than from investigating an organism which she cannot put together, but in tracing back the history of matter, science is arrested when she assures herself, on the one hand, that the molecule has been made, and on the other that it has not been made by any of the processes we call natural.

"Science is incompetent to reason upon the creation of matter itself out of nothing. We have reached the utmost limit of our thinking faculties when we have admitted that because matter cannot be eternal and self-existent, it must have been created. It is only when we contemplate, not matter in itself, but the form in which it actually exists, that our mind finds something on which it can lay hold. That matter, as such, should have certain fundamental properties, that it should exist in space and be capable of motion, that its motion should be persistent, and so on, are truths which may, for anything we know, be of the kind which metaphysicians call necessary. We may use our knowledge of such truth for purposes of deduction, but we have no data for speculating as to their

origin. But that there should be exactly so much matter and no more in every molecule of hydrogen, is a fact of a very different order. We have here a particular distribution of matter, a collocation, to use the expression of Dr. Chalmers, of things which we have no difficulty in imagining to have been arranged otherwise. The form and dimensions of the orbits of the planets, for instance, are not determined by any law of nature, but depend upon a particular collocation of matter. The same is the case with respect to the size of the earth, from which the standard of what is called the metrical system has been derived. But these astronomical and terrestrial magnitudes are far inferior in scientific importance to that most fundamental of all standards which forms the base of the molecular system. Natural causes, as we know, are at work, which tend to modify, if they do not at length destroy, all the arrangements and dimensions of the earth and the whole solar system. But though in the course of ages catastrophes have occurred, and may yet occur in the heavens; though ancient systems may be dissolved and new systems evolved out of their ruins; the molecules out of which these systems are built—the foundation stones of the material universe—remain unbroken and unworn. They continue this day as they were created, perfect in number, and measure, and weight, and from the ineffaceable characters impressed on them we may learn that those aspirations after accuracy in measurement, truth in statement, and justice in action, which we reckon among our noblest attributes as men, are ours because they are essentially constituents of the image of Him who in the beginning created, not only the heaven and the earth, but the materials of which heaven and earth consist."

The last word of science on this subject was spoken by Dr. Siemens in his Inaugural Address as President of the

British Association for the Advancement of Science, at its meeting in 1882, which, after an able review of the progress of the arts and sciences during the year, he concluded with a reverent doxology to the God who made this progress conduce to the welfare of mankind. He concludes:

"We shall thus find that in the great workshop of nature there are no laws of demarcation to be drawn between the most exalted speculation and commonplace practice, and that all knowledge must lead up to one great result—that of an intelligent recognition of the Creator through his works. So then, we, members of the British Association, and fellow-workers in every branch of science, may exhort one another in the words of the American bard who has so lately departed from among us:

"'Let us then be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labor and to wait.'"

Thus true science contradicts the Nebular Hypothesis as unproven and incapable of proof; as contradicted by all the arrangements of our solar system; as contrary to the first principles of mechanics; as assuming an eternal homogeneous matter which has no existence in heaven or in earth; and as contrary to the fundamental constitution of the molecules of matter; in a word as an impossible dream.

The atheistic notion of an eternal, or self-creating world, is thus seen to be utterly unscientific and absurd. We fall back upon the sublime declaration of the Bible, "In the beginning God created the heaven and the earth."

GEOLOGICAL EVOLUTION.

THE ERRORS OF EVOLUTION.

GEOLOGICAL EVOLUTION.

ITS PEDIGREE, PRETENSIONS, AND PREDICTIONS.

Geology takes up the science of world-making where astronomy leaves it. Of course, if the astronomical theory of cosmogony be proved false, the geology which is founded on this falsehood must be erroneous also. We have shown the falsehood of the Nebular Theory from the discoveries of science, and it might seem superfluous to proceed any farther with the geology founded upon such a chimera. But geologists are very often ignorant of any science save their own; and, moreover, quite contemptuous in their treatment of other scientific men, and quite persistent in reiterating anything they once begin to say. Though, as we shall see by-and-by, every generation of geologists overturns the theory of its fathers, to build a brand-new system out of the materials, it is almost impossible to eject the system-builder from his favorite structure. He is generally as immovably fixed in his blunders as one of his own boulders in a quagmire; only the unlucky boulder does not boast of his bad luck, or of his stupidity in rolling into the mire and staying there. We naturally cherish a strong suspicion of any geological theories of creation. They are to be suspected, at the very outset, as coming from a rash and careless source of speculation.

Indeed, as a general principle, it is exceedingly desirable at the present day to abate the superstitious reverence of our youth for anything which calls itself science. What is science? What do they know about it? Of what value to mankind have been the ninety-nine hundredths of all the speculations of scientific men? Science, reader, so far as you and I are concerned, is whatever scientific men please to tell us; and they are pleased frequently to tell us very wonderful tales. How much of them to believe is not always easy to discover; but no man save a fool will swallow everything a scientific man may tell him as science. The Papist, who receives all the conflicting opinions of the fathers as his faith, has a moderate load of inconsistencies in his stomach, compared with the scholar who accepts all the theories of geology which scientific men have given to the world.

It may be said that science is the knowledge of truth, the interpreter of nature; and, therefore, true science is infallible. We demur. True science is true, no doubt of it; but how do you know that your science *is* true? Nature is infallible; but her interpreters are men of like passions with ourselves; and, with reverence be it spoken, one of these is a very strong desire to expose the mistakes of their predecessors, companions, and rivals. Thus, in tracing the history of geology, we find adverse facts and hostile theories arrayed against each other. The facts without the theories never were, and never will be, of the least interest to the world. Who cares about the destinies of crabs, crocodiles, and cave bears? It is only as they are related to theories of creation and development that they possess the slightest interest for mankind. In truth, of theories of creation geology has been prolific. But in tracing the succession and conflicts of these theories our faith in the infallibility of science receives a shock, of the same kind as the believer in the infallibility

of the Romish Church receives, when he reads of the controversies of the one hundred and fifty-seven sects who anathematized each other within her pale. A general scepticism of geological theories necessarily results from a review of the succession of baseless notions which geologists have obtruded upon the world. The idea of placing such speculations for a moment on a level with any ascertained historical fact, or authentic document, could only excite a smile on the face of any one familiar with their origin. But our college boys are ignorant of the history of such theories; and therefore bow down to them as veritable gods of science. Let us visit the workshop where these deities are manufactured, and, as the best exorcism for such scientific superstition, let us briefly review

I. THE HISTORY AND PEDIGREE OF GEOLOGY.

Geologists cannot raise any objection to such a course of examination, since each author begins his work with a review of his predecessor's discoveries. Indeed Mr. Herbert Spencer formally argues the value of such an investigation of the genealogy of any science, as follows:

"Inquiring into the pedigree of an idea is not a bad means of roughly estimating its value. To have come of respectable ancestry is *prima facie* evidence of worth, in a belief, as in a person: while to be descended from a discreditable stock is, in the one case as in the other, an unfavorable index. The analogy is not a mere fancy. Beliefs, together with those who hold them, are modified, little by little, in successive generations, and as the modifications which successive generations of the holders undergo do not destroy the original type, but only disguise and refine it, so the accompanying alternatives of belief, however much they purify, leave behind the essence of the original belief." He proceeds accordingly to show

the discreditable origin of the Bible, in Hebrew mythology.

His remarks, however, apply with full force to the genealogy of geology. It was cradled in poetry and mythology, and its children of the nineteenth century claim their kindred to the Titans. The poets, too, recognize the geologists as brethren. When Professor Sedgwick was staying with Wordsworth, pursuing his geological researches, he labored long in vain to interest the poet in his favorite science. At length, one day he persuaded him to accompany him on a geological excursion, showing him the strata, and giving him the theory. The poet at once brightened up. "O, Professor," said he, "I begin to like your geological pursuits very much, there is so much imagination in them."

Geology comes honestly by its grand poetical visions. It was born in the gorgeous and glowing East. The land of Sinim is the cradle of geology. While the great-grandfathers of our Lyells and Hitchcocks were roasting wild boars upon the stalagmite pavement of the bone caves of Britain, all incurious concerning the precious deposits of bare bones and fossils over which they stretched their naked limbs, the geologists of China were observing diluvial phenomena, and forming geological theories, which, as they are the oldest, so they are decidedly the most popular expositions of that science. Taking into account the number of literati in China, and the fact that there are no conflicting systems, Chinese geology, professed by ten times the number of savans claimed by any western system, and continuing unchanged for at least a millennium, carries with it a weight of authority for which the conflicting novelties of Hutton and Werner will long sigh in vain. Like them it begins at the granite, and concurs with them in ascribing to it a great elevation in the geological era, finding it quite as troublesome and intrusive as in Europe.

In fact, it enveloped the present world like a vast shell, leaving the earth to occupy the position of Pluto and Proserpine in Capt. Symmes' interior world. As no opening had been provided, and daylight and air could not reach the surface, great inconvenience was experienced. Heaven was formless, an utter chaos. Order was first produced in the pure ether. From the subtle essence of heaven and earth, the dual principles Yin and Yang were formed. From their joint operation came the four seasons, and these putting forth their energies, gave birth to all the products of the earth. The first man, Pwanku, was hatched from the chaos by the dual powers, like Darwin's first men; though, of a nobler turn of mind, he did not sit down chipping flint axes at Abbeville, but devoting himself to practical geology, he seized hammer and chisel and commenced the work of clearing off the granite crust.

THE CHINESE MANUALS OF GEOLOGY,

which must be exceedingly interesting to those scientific skeptics who have so long praised Confucius and sneered at Moses, give wood engravings, showing him hewing out vast masses of granite, with the sun, moon and stars appearing through the openings; and exhibit the tortoise, dragon, and phœnix, whose genesis is as obscure as that of the granite, uniting with Pwanku in grinning hugely over the success of his toils. For eighteen thousand years he continued his labors, and grew with his work. The heavens rose, the earth spread out, and Pwanku increased in stature, each of them six feet, not in a century, according to Lyell's slow system, but every day. His labors done, he died for the benefit of his works. His head became mountains, his breath wind and clouds, his voice thunder, his limbs were changed into the four poles, his veins into rivers, his sinews into the undulations of the earth's surface, and his

flesh into fields; his beard, like Berenice's hair, was turned into stars, his skin and hair into herbs and trees, his teeth, bones, and marrow into metals and rocks; his dropping sweat increased to rain, and the insects which stuck to his body were transformed into people.* Sublime and simple theory of evolution!

It is our misfortune, however, to live in an improving world, in which men will propose to amend almost everything; so when Pwanku was gone, a race more imaginative than the Chinese resolved on an improved cosmogony. Starting from the Lyellian notion that what is, is what has been, and perceiving that all organized existence is from the egg, and believing the universe to be an organized being,

THE HINDOO GEOLOGISTS

say that Brahm produced a vast egg containing all atoms, qualities and principles, which floated, like our nebular essence of solar systems, in the abyss. Disdaining the paltry 18,000 years of their careful Chinese predecessors, the Hindoo sages, with genuine geological generosity of time, assigned to Brahm 1,000 *yugs* or 4,300,000,000 solar years, for hatching the egg. Fourteen strata of worlds were thus produced, of which our earth is the eighth. These are all minutely described in the Vedas. The primary, secondary, tertiary, etc., are the abodes of monsters and all manner of loathsome creatures. Our own earth is circular, like the flower of the water lily, in which the rows of petals project beyond each other. It consists of seven concentric islands, in which we are placed upon the central, Jamba Dwip, surrounded by a sea of salt water. The second island is washed by a sea of sugar-cane juice. The third island, lying around the sea of sugar cane juice, by some diabolical distillation,

The Middle Kingdom. S. Wells Williams, New York, 1863. II. p. 196.

is surrounded by a sea of rum. The fourth island is surrounded by a sea of melted clarified butter. This and the others are probably prairie or pasture lands, as the seas successively consist of sour curds and milk, and lastly of sweet water—rather a luxury after such a voyage among sweets—for the diameter of each of these islands and seas is a good many hundreds of thousands of miles. The diameter of the whole arrangement is considerably larger than that of La Place's nebulous cloud, which contracted itself so wonderfully in taking up house in our little solar system, and which also had a habit of peeling off into concentric rings like those of Brahm's manufacture.

HINDOO GEOLOGIC CYCLES.

The Hindoo geologists also recognize the necessity of providing mountain chains sufficiently large to afford materials for such a breadth of sedimentary strata, a necessity which none of our western geologists has ever ventured to consider. The centre of our earth is accordingly occupied by Su Meru, a mountain several thousand miles high; and which they declare to be in the shape of an inverted pyramid; as indeed are all mountains traced to the centre of the sphere. Its mango and rose-apple trees, producing fruit as large as elephants, the juice of which forms mighty rivers, would more properly fall into the department of botany, but for the mineralogical influence of the waters in converting the earth over which they pass into purest gold.

But it is only when we come to the question of duration that the grandeur of Hindoo geology displays itself. Truly our western savans must enlarge their idea of cycles if they be found worthy to loose the sandals of the Brahmins, whose numeral characters they employ. A day of the gods is one of our solar years—three hundred and sixty such constitute a year of the gods—twelve thousand such, form an age of the gods, a *maha yug* or

4,320,000 years of mortals. Seventy-one of these compose a *manwantara*, or great cycle, during which one Manu reigns on the earth. Of these, fourteen reign in succession, each introducing a new creation of species; for the course of Hindoo geology is catastrophical, beginning well, progressing through golden, silver, brass and iron ages, to a general degeneracy of nature, and insufferable wickedness of mankind, and ending in deluges and earthquakes which depopulate the world. The sun, moon and stars are shrouded in darkness, clouds from above pour down torrents of rain. The seven lower worlds are at once submerged, as well as the earth we inhabit, and the inundation rises till the two superior worlds are drowned, reaching even to the pole-star. Then Brahma appears, and recreates the world. This constitutes a day of his life, and his night has the same duration. Three hundred and sixty of these periods of activity and repose constitute a year of his life, which consists of a hundred such years, or three hundred billions of common years! The most magnificent theories of the West pale before these glorious rays of the Eastern sun. But though grand and vast, these calculations are by no means indefinite. The point which has so long engaged the ingenuity of western geologists in vain, the connection of geological chronology with present time, is as definitely settled as the age of the pyramids. We are now in the 4,959th year of the *Kali yug*, of the 28th *Maha yug*, of the seventh *manwantara*, of the first day of the 51st year of Brahma—in the middle of time.*

We should, however, do our readers, and the human mind, a gross injustice if we left them to suppose that we have reached the limit of speculation. There is, in truth, nothing which more fully asserts man's celestial origin than his adventurous progress into the regions of

* Duff's *India and India Missions*. Edinburgh, 1840. P. 112.

space and time. We come now to trace the Hindoo geology as developed without the theological element, by a people of atheists, or at least by nations who do not believe in an Eternal God, and who expect the annihilation of all beings. Though neither so ancient nor so popular as the Pwanku geology, these Brahmin and Buddhist systems have the prescription of twenty-four centuries, and the support of 300,000,000 of mankind at the present day. If the authority of literati is to be regarded, let us hear the bonzes. "The common age of man," say they, "has been fluctuating from eternity, like the ebb and flow of the sea. There is a time when the years of his life are only ten, but they continue swelling gradually till they amount to one hundred quadrillions of quadragintillions; a number designated by

A UNIT AND ONE HUNDRED AND FORTY CIPHERS.

When man arrives at this age of longevity, which the Burmans term an *a-then-kya*, his age decreases with the same imperceptible slowness until it is again reduced to the term of ten years."

This inconceivable stretch of time, for which the English language has no name, and before which figures become useless, constitutes what the Burmans call an Intermediate Period. Sixty-four of these make one Cardinal Period, and four Cardinal Periods constitute a Grand Cycle, or *Kambah.* Gaudama, the last Buddha, toiled through four *a-then-kyahs* of these Grand Cycles to obtain his divinity, with the trifling addition of 100,000 *Kambahs* at the end. In the presence of such Cycles, the pigmy western geological eras of a few hundred millions of years are but the tickings of the clock.

Indeed, each *Kambah* comprehends one entire revolution of nature. The period begins with the destruction of the old world, by the three elements—fire, air, and water. During the first of the four Cardinal Periods

which constitute a *Kambah* the earth is enveloped in a conflagration—the igneous process. During the second Period the flames are struggling with roaring winds and dashing waters. The third Period is occupied with processes of reconstruction—the process of deposition of sedimentary strata. At the beginning of the fourth Period a little spot of earth appears in the midst of the waste of waters, and the spirits that have escaped the conflagration bend down to gaze with interest on a magnificent lily which springs from the centre of the mound. If it blossoms, they are filled with joy; for the period is to be blessed with the advent of as many Buddhs as there are flowers in the lily. Frequently it is barren; then the period is full of gloom, and all creatures are degraded and miserable. The present *Kambah*, as will readily be believed, is of an extraordinarily high order, the emblematic lily having borne five blossoms. Four Buddhs have already been developed, and have passed into annihilation, and one is yet to be. As the waters continue to recede, the beautiful results of the processes carried on during a previous period become visible. The Myen-mo mount stands in the centre of the rising system, encircled by seven graduated ranges of mountains, separated from each other by seven belts of water. Beyond these, in the direction of the cardinal points, appear four large islands, around each of which cluster five hundred smaller ones; and the whole is encompassed by a wall of incalculable height and magnitude. The base of the central mountain is inhabited by five races of monsters. Above these, winding from the base, and extending thence to the summit, is the first celestial region, and, above that, twenty-four others. The distance from the foot of the mountain to the highest heaven is 864,000,000 miles. The Myen-mo mount is arranged on three immense rocks, with a vacant place in the centre occupied

by the Titans who have been banished from the celestial regions. Below this are arranged eight hells, one immediately below the other, extending through a layer of earth 120,000 miles in thickness. The earth rests on a rocky stratum of the same depth, beneath which is a continually restless flood of water, and below this a similar body of air, by the mighty force of whose continued action and reaction the whole structure is supported,* much as our western geologists support theirs on a fluid and gaseous nucleus.

EGYPTIAN AND GRECIAN GEOLOGY.

We find substantially the same ideas in the Egyptian cosmogony, as taught by the Greeks, who derived their letters, philosophy, and science from the East. But we are conscious of a sad falling off from the sublimities as we cross the Mediterranean, and converse with matter-of-fact Europeans. The great Cycle, or year of the universe, is reduced to 360 days of 1000 years each. Pythagoras could not obtain acceptance for the Copernican system in his day, because it did not correspond to the ocular phenomena. Successive destructions of the globe by fire and water were presented, not as theories, but as facts, and were vindicated by the submersion of the island or continent of Atlantis, after repeated shocks of an earthquake, and by the deluge of Deucalion. Successive reconstructions were exhibited in the marine shells on the tops of the mountains, the growth of the delta of the Nile, and the upheaval of Delos. These, however, do not appear to be regarded as proofs of a universal destruction and regeneration, by Aristotle, who propounds Lyell's theory fairly when he says, "The distribution of land and sea in particular regions does not endure throughout all time, but it becomes sea in those

* Wayland's *Life of Judson*. Boston, 1853, ii. 411.

parts where it was land, and again it becomes land where it was sea, and there is reason for thinking that these changes take place according to a certain system and within a certain period."* They were acquainted with the remains of the geological monsters, and believed in new creations of species, but after the mode of equivocal generation. The transmutation of species was generally accepted as a fact, Anaximander, an ancient Darwin, declaring "that the earth assumed its present form in consequence of the evaporation of the primeval water by the heat of the sun, and acquired a muddy consistence. Vesicles were formed by the escape of air, as takes place at present in fermenting marshes. In consequence of evaporation these vesicles acquired spiny shells or crusts, and became vivified by the sun's rays. These ova at last burst their shells and came on dry land." Both the earth and animals went through a process of development; the first men being aquatic and covered with spines, like sea-urchins or hedgehogs.† And as it is a poor principle which will not work both ways, the ancient geologists believed in the metempsychosis, or the return of man to his primeval oyster, under favorable conditions, or into any of the intermediate stages of being, of which Ovid gives numerous examples in his *Metamorphoses*‡—and, having the facts, winds up with the philosophy of Pythagoras in his fifteenth Book. The philosophical probability of the permanence of the principle of degradation being equal to that of elevation, is indisputable, and the historical illustrations far more abundant. It is therefore much more likely that the Bushmen are degenerating into monkeys, and the Australians into kangaroos, than the reverse. While some slight

* *Principles of Geology.* Sir Charles Lyell, F. R. S. 9th Edit. p. 13.

† *Principles of Geology*, by King, Edinb. 1851, p. 238.

‡ *Ovid's Metamorphoses*, Lib. i. Fab. 1. Lib. viii. Fab. 22. Lib. vi.

differences of opinion still agitate Positive Philosophers, whether monkeys are becoming men, or men are becoming monkeys, and as to the length of time needed for the change, they are quite agreed that, in either case, the original animal, like Topsy, never was made, but simply grew—or, to put the matter in the words of Baden Powell, "It has been the unanswered and unanswerable argument of another reasoner, that new species must have originated *either* out of their inorganic elements, or out of previously organized forms—*either* development *or* spontaneous generation *must* be true." Of course, if there be no Creator, not only the worms, but the paving-stones also, must make themselves! "A work has now appeared by a naturalist of the most acknowledged authority—Mr. Darwin's masterly volume on the 'Origin of Species' by the law of 'natural selection,' which now substantiates on undeniable grounds the very principle so long denounced by the first naturalists—*the origination of new species by natural causes*—a work which must soon bring about an entire revolution of opinion in favor of the grand principle of the self-evolving powers of nature."* We have thus, after the lapse of two thousand years' wandering in the fogs of Christianity, at length returned to our paternal heathen home, and got comfortably lodged again in the swamps and ocean ooze, beside that great prophet of nature, the spiney-crusted Anaximander. A few naturalists like Agassiz, are still prejudiced in favor of a Creator, and labor through lengthy chapters to prove that cabbage is not corn, and that there is some little difference between a goose and a geologist. They are, however, regarded with charitable compassion by the more advanced school.

With such weight of philosophy and authority for the spontaneous generation of species of living beings, it is

* *Essays and Reviews*, p. 571.

truly wonderful that any doubt could have arisen as to the easier process of producing lifeless fossils on the same principle. The best

GEOLOGISTS OF THE SIXTEENTH CENTURY

learnedly proved their spontaneous origin. Agricola, a practical geologist, taught that a certain "*materia pinguis*," or "fatty matter," set into fermentation by heat, gave birth to the fossil organic shapes resembling shells and bones, which, in the sixteenth century, were discovered in great numbers. Falloppio, of Padua, the celebrated Professor of Anatomy, the Owen of that day, asserted and proved that petrified shells are generated by fermentation, in the spots where they are found; or that in some cases they had obtained their form "from the tumultuous movements of terrestrial exhalations." He alleged that certain tusks of elephants dug up in his time, in Apulia, were mere earthy concretions; and, consistently with these principles, he supposed it probable that the vases of Monte Testaceo at Rome were natural impressions stamped on the soil. Mercati, the first geologist who illustrated his works by faithful engravings of the fossil shells in the Vatican Museum, described them as mere stones which had assumed their form through the influence of the heavenly bodies. Olivi, of Cremona, a geologist of Verona, described the contents of a rich museum as "sports of nature."*

But the unscientific multitude would not be persuaded that the stars, or the plastic power of nature could make shell-fish or bones, either living or dead, and would have it that the fossils had all been once alive, and that the shell-fish once lived in the water; and as they were posed with the query, how they found their way to the tops of the mountains, they boldly referred them all to Noah's

* *Lyell's Principles*, p. 21.

flood, the only submersion with which they were acquainted.

THE GEOLOGISTS WERE FAIRLY OVERWHELMED

by the numbers of the writers who disputed the Development Theory. Cardana, a transcendental philosopher, Cesalpino, a botanist, Fabio Colonna, Steno, the Danish physician, Scilla, the painter, and a great multitude of other diluvians, insisted that shells were shells, and bones were bones, with such success that the geologists were compelled to admit the fact.* Voltaire was the last of the philosophers who maintained a desultory warfare against vulgar common sense, maintaining that the fossils were either sports of nature, or shells fallen from the hats of the pilgrims from Syria. Yet, according to his custom, he believed the contrary, as his *Essay on the Formation of Mountains* shows; being prompted to lie by his hostility to the Bible account of the Deluge, of which he feared these fossils might be accepted as proofs. A century before, Steno had proved that Italy had been twice under water. The controversy is not yet ceased whether the diluvium and the upper fossils of the superior strata were deposited by the Noachic Deluge, or by some earlier submersion.

These, however, were speculations confined to the learned; but about the same time geologists appealed to the people, and created a perfect furore of excitement—a regular gold-fever. The question as to where the shells and bones came from could not be heard when the question was proposed, "Where did the gold come from?" The world was astonished at the treasures the Spaniards had gathered from the Indians of South America and shipped to Europe; and the great question, "Where did these savages procure all the gold?" excited the deepest

* *Lyell's Principles*, p. 22.

interest. There was, undoubtedly, more where that came from; and if Indians got so much, Spaniards and Italians could certainly get more. The furnaces of the interior of the earth constitute nature's great laboratory. Volcanoes are the furnace doors. There the outlets of the precious metals are to be sought. The crater of the volcano of Masaya, in Nicaragua, always exhibits, at a depth of several hundred feet, a glowing mass of melted metal which shines like molten gold. Blas de Castilio and Juan de Oviedo associated with themselves a joint stock company, and toiled for months to convey to the interior of the crater a windlass, chains, and a beam thirty feet long, to project over the abyss, appropriately called the Hell of Masaya. De Castilio, protected by a helmet on his head, and a crucifix in one hand, was lowered down over the molten gold, which he in vain endeavored to dip up in an earthen vessel contained in an iron pot. The operation was frequently repeated, and the adventurers gave out that, like most other daring adventurers, they could never grasp the tantalizing liquid; till the Governor, suspecting smuggling of the precious metal, forbade further descents. Oviedo petitioned the Emperor for the right to bear the Hell of Masaya on his coat of arms, and Castilio and his companions took oath to die in the belief that it was full of molten gold and silver. If modern geologists have failed to discover lakes of molten gold, let us be grateful for the globe of molten granite they have given us.

While practical geologists were thus risking their lives to increase the sum of human happiness and bullion, the windier sort were as busy as their children, in inventing all manner of causes for the changes of surface exhibited on the wrinkled face of our unfortunate planet. Hooke and Burnet, in the seventeenth century, following the example of Alessandro in the fifteenth, kept shifting

the position of the earth's axis of rotation, so as to make it spin head-foremost or downward, with general whisking about of oceans, cracking of continents, and deaths of elephants, monkeys, and other comfortably raised species, from exposure to colds. But Newton, who had taken a deal of trouble to get the earth properly balanced, would not allow his theory of gravitation to be disturbed; just as our watchful Astronomer Royal, Airey, has been ordering the surveyor out of the engine-room, to play no more experiments with the axis, on pain of a general crash.* Whereupon the geologists commenced pelting the roof with comets; and Whiston, especially, brought one down with such a power of mathematical demonstration, at the era of the Deluge, that the crust of the earth melted under it like a lump of sugar under the torrent of a tea-pot, and all creation, upon drying up, found itself conglomerated in the existing general muddle. To console the terrified terrestrials, however, Burnet spanned the geological horizon with a bow of promise, called *The Sacred Theory of the Earth; containing an Account of the Origin of the Earth, and of all the General Changes which it hath already Undergone, or is to Undergo, till the Consummation of all Things.*

People were just beginning to draw their breath, and to sleep soundly of nights, after the translation of *Burnet's Theory* into the vulgar tongues from the original Latin, when one day in 1740, amidst repeated shocks of an earthquake, an island of white rock, covered with living oysters and other crustacea, without leave of the geologists, raised its head out of deep water, twenty-five feet above the surface of the Gulf of Santorin, in the Mediterranean, and laughed at the philosophers, through the pages of one Moro, who assembled an imaginary party of geologists, ignorant of its origin, upon the island,

* *Annual of Scientific Discovery*, Boston, 1861. p. 287. 1862, p. 256.

and recites their interpretation of the phenomena in support of their various theories. One points to the marine shells as proofs of the universal Deluge. Another demonstrates from them the former residence of the sea upon the mountains. A third dismisses them as mere sports of nature. The fourth alleges they were born and nourished in ancient caverns in the rock, into which salt water had been raised in vapor by subterranean heat. Had Sir Charles Lyell been invited, he would have proved that not less than five centuries had been occupied by the island in raising itself above the surface of the water, at the rate of five feet in a century, but would have modestly declined an estimate of the millenniums of its ascent from the abyss.

LIEBNITZ AND BUFFON'S GEOLOGIC THEORIES.

While people were thus busy out of doors repelling inundations, comets, and the like, they were all unconscious of the terrible conflagration within, from which they had a narrow escape by the Herculean efforts of the geological firemen, who, however, it was suspected by many, had kindled the blaze for the pleasure of extinguishing it, but who were first seen playing on the smouldering cinders and cracked walls. At least, Liebnitz, in his *Protogea*, declared this planet to have been originally a burning, luminous mass, which has been cooling ever since its creation. When the outer crust cooled sufficiently, the vapors began to deluge it, and formed an ocean, covering the loftiest mountains, which, naturally enough, cracked, like a stove on which water is spilled, and the ocean ran in through the cracks, leaving deposits of sediment above, and making terrible eructations below. He learnedly recognized, therefore, a double origin of primitive masses, namely, of cinders from the fire, and mud from the water, and amazed mankind by the revelation of these mysteries of geology.

Half a century later these profound discoveries of the great mathematician were eloquently expounded by the great naturalist, Buffon, who spread out all the strata horizontally, or rather concentrically, and made a nice regular onion-coated globe; which, however, the meddlesome poking of miners and other non-scientific men has so greatly deranged that modern geologists allege that it only existed in his own brain; especially as, acting on Sydney Smith's principle of never reading a book he intended to review, for fear of contracting a prejudice against it, he knew nothing about geology himself, though accepted by multitudes with great earnestness as their scientific guide, and opposed by others with equal seriousness. But the Fathers of the Sorbonne, who, from a habit of poking among musty manuscripts, had acquired a keen scent for old heathenisms, even though dressed and perfumed in French costume, raised the hue and cry of heresy. Fourteen propositions of Buffon's were declared reprehensible, and contrary to the creed of the church; and he was invited to recant his unorthodox opinions—"that the waters of the sea have produced the mountains and valleys of the land; that the waters of the heavens, reducing all to a level, will at last deliver the whole land over to the sea; and the sea, successively prevailing over the land, will leave new continents dry," etc. The eloquent savan retracted, and in his next edition declares, "I abandon everything in my book respecting the foundation of the earth, and generally all that may be contrary to the narration of Moses."* Whether, like Galileo, he lied against his conscience to avoid unpopularity and suffering, or whether the mere request of the Sorbonne sufficed to convince his judgment of his error, concerns us not. In either case, science seems to have but a slight hold on the faith of its high priests.

* Buffon. *Natural History.* vol. v.

The most drivelling religious superstitions have taken such hold of their votaries that they marched boldly to the gallows or the stake rather than deny their convictions. What modern philosopher has ever so attested his theory? Alas! alas! The heroic ages of science are gone. The Megatherium was the last martyr of geology.

THE NEPTUNISTS AND VULCANISTS.

About the beginning of the present century Werner began to poke about among the mud of the ruins, and finding evidences of stratification in the mines of Germany, he taught that all rocks were originally formed under water. Hutton, a Scotch doctor, directing his attention to the cinders, and finding granite overlapping stratified rocks, declared they were formed by the action of fire. Moreover, he horrified the geologists—who were fast becoming wise as gods from the fruit of their tree of knowledge—by alleging that he found no traces of a beginning of things in the rocks, and no indications of an end. He would fain have philosophers content themselves with the accumulation of facts, and abjure theories; as if money were of any use unless we could spend it, or science were possible without a theory of causation. Geology without cosmogony is as impossible as a house without a builder. The Wernerians and Huttonians, or Neptunists and Vulcanists, as they are now called, have waged conflict with various success to the present hour, when some recent discoveries of the aqueous origin of granite seem likely to drown out the Vulcanists, who, however, are not easily extinguished.

Thus these opposing theorists quarrelled about their superficial notions of the outside of the world, leaving its vast interior all unknown. The portion of the earth's crust which furnished the basis of all these speculations bears about the same proportion to the neglected mass

that the shingles do to a house. But Lesley set himself to compute at what depths liquids and gaseous substances could be compressed into a density greater than that of gold by the weight of the superincumbent strata; and weighing the globe with the pendulum, proved that it consists of a hollow sphere filled with imponderable matter, having an enormous force of expansion. But the celebrated Halley declared that the hollow was occupied by a subterranean, freely-rotating, nucleus, which occasions by its position the diurnal changes of magnetic declination. Now as there is no way of settling the controversy but by going there to see, Captain Symmes publicly and frequently invited Baron Humboldt and Sir Humphrey Davy to accompany him on his voyage of discovery to these infernal regions; where a uniform temperature secures eternal spring, and two subterranean planets, Pluto and Proserpine, shed a mild light on the plants and animals during that portion of the year when the sun does not shine on the great opening near the North Pole, whence the polar light emanates, and through which the navigators would enter. It is deeply to be regretted that this interesting discovery failed through the timidity of the philosophers. Since that period a set of unenterprising and malicious geologists have set themselves about the stupid task of filling up this beautiful inner chamber with rocks and iron; and some diabolical spirits, without any care for the risk of having a bonfire in the cellar, would have it full of red-hot melted granite.*

These brilliant theories, however, are treated by our modern geologists with contempt. Destitute of that filial piety which builds the monuments of departed ancestors, and cherishes their fame, they take pains to assure us that geology has nothing to do with cosmogony; and that cosmogony is beyond the sphere of inductive

* *Cosmos*, i. p. 163.

science; after which they almost invariably treat us to a cosmogony of their own. They should remember the commandment, "Honor thy father and mother, that thy days may be long in the land," lest their children treat their theories with as much contempt as they treat those of their fathers. They are, in truth, though less brilliant, not less ridiculous.

In obedience to Mr. Herbert Spencer's directions we have thus examined the pedigree of geological evolution. Our readers may well ask, Can the history of human thought furnish another such combination of ignorance, arrogance, and superstition? Verily, verily, it must be born again before it can enter the kingdom of science and truth.

II. THE CLAIMS AND PRETENSIONS OF GEOLOGY.

We have seen the pedigree of our Modern Geological Evolution. We need not look for a noble progeny from such a parentage. Under the law of heredity, which our evolutionists affirm governs all descent, the union of falsehood and absurdity in the Nebular Hypothesis can produce only error and nonsense in its geological descendant. And we would be fully warranted by their own doctrine in rejecting, without further examination, a theory conceived in error and shapen in absurdity; for who can bring a clean thing out of an unclean?

But here our evolutionists become unhappy under their own law, and loudly vociferate their total independence of all the former geologies; which they treat with a scorn most unbecoming in children toward their parents. They demand that modern geology shall be tried solely on its own merits, and that it shall not be condemned for the blundering stupidity of its ancestors.

Very well, that is Bible doctrine—"The son shall not die for the iniquity of his father." Our evolutionists will

then please bear in mind that at the very threshold of the argument they stumble, and are compelled to fall back on Bible principles, that their theory may draw its very first breath.

Modern geology, as its expounders tell us, dates from 1815. There were heroes before Agamemnon, but no conquest of Troy. There were reformers before Luther, but no Reformation. So there were geologists before William Smith, but no geology till he published his Geological Map of England in 1815. Sabine alleges that this was the first production of order out of chaos. Our young science has not completed its first century. All the other physical sciences have been the slow growth of the observations and labors of many successive generations of students; but geology, like Minerva, springs, full-grown and armed, from the brain of William Smith, and turns the Gorgons of its shield toward the other sciences, and shakes its spear, threatening death to all who dare to interfere with its domain.

The task which our young Titan undertakes is indeed vast. Unwarned by the misadventures of the past, and confident in their own universal ability, modern geologists boldly launch out on the ocean of speculation, with the confident design of discovering the origin of the world. Nothing less than a cosmogony will satisfy them as a basis for their science. It seems useless to remind them that this is quite unscientific ; that science, by its very nature disclaims knowledge of origins, that it can only deal with facts, and that in arranging them it must assume design, and so rest on faith, and that a cosmogony must be a creed, not a science. Nevertheless modern geologists feel bound to construct a cosmogony or spoil a science: to make a world or explode their theories in the attempt.

In representing the pretensions of geological evolution

it may be well, not only to cite eminent private geologists, but also to quote the very words of the public officers and professors of State Universities, paid by the State for teaching our American youths this newly-established religion. For though the States may not pay Christian teachers for teaching Christianity, they are now paying

A NUMBER OF ANTI-CHRISTIAN CLERGYMEN,

called professors, for retailing their guesses and predictions about a world of which they know neither the beginning nor the end; and concerning the very materials of which they cannot learn as much as a fly could learn about an orange by walking over it and tasting its rind.

Geology may be briefly defined as the science of world-making. It is by no means content with a classification of facts; every lecturer and author sets out with a cosmogony. The prevailing cosmogony makes the world out of molten metals. Thus the State Geologist of Illinois: "Geology is that department of natural science which treats of the earth's structure and development; and it carries us back, through a regular sequence of cause and effect, to a period when the material of which it was composed existed in a state of liquid fusion; or, in other words, when the earth was a globe of liquid fire. The radiation of heat from the surface resulted in the gradual cooling of the mass, and thus the first rocks were formed, as modern igneous rocks are now formed, by the cooling of mineral matter ejected from existing volcanoes."* In the same strain, only more modestly, Buckland begins his explanations: "*Assuming* that the whole materials of our globe *may have once been* in a fluid, or even in a nebular, state, from the presence of intense heat, the passage of the first consolidated portions of this fluid or nebulous matter to a solid state, may

* *Geological Survey of Illinois*, p. 10.

have been produced by the radiation of heat from its surface into space; the gradual abstraction of such heat would allow the particles of matter to approach and crystallize; and the first result of this crystallization *might* have been the formation of a shell or crust composed of oxidated metals and metalloids, constituting various rocks of the granite series, around one incandescent nucleus of melted matter heavier than granite."* This is a candid confession that the whole affair is only a hypothesis, a mere assumption. But the third-rate geologists are quite positive and clear, upon second-hand reading, of the certainty of that which Buckland, Phillips, Lyell and Macculloch acknowledge to be merely a hypothesis. This is generally the case; second-hand science is the genuine positive philosophy. We have before us now a shilling school-book, which gives a three-inch map of the whole affair; the mountains projecting from the sphere like the teeth of a circular saw; the hundred miles' depth, below which Wedgwood's fire-clay pyrometer melts, marked with a dark band, and the fused interior left white; the whole very like the section of a sucked orange. At the Chicago Artesian well you may see the paintings on a large scale, of the whole process, as seen in vision by a spirit seer. Every geological lecturer sets out with a full and particular account of the whole operation, as seen in geological vision. It was some such clear view of the visions of geology which upset the faith of C. W. Goodwin, M. A., and his fellow essayists, in Moses' cosmogony. He tells us that, "The first clear view which we obtain of the early condition of the earth presents to us a ball of matter, fluid with intense heat, spinning on its own axis, and revolving around the sun. How long it may have continued in this state is beyond calculation or surmise. It can only be believed that a prolonged

* *Bridgewater Treatise*, p. 40.

period, beginning and ending we know not when, elapsed before the surface became cooled and hardened and capable of organized existence. The water, which now enwraps a large portion of the face of the globe, must for ages have existed only in the shape of steam, floating above and enveloping the planet in one thick curtain of mist. When the cooling of the surface allowed it to condense and descend, there commenced the process by which the lowest stratified rocks were formed and gradually spread out in vast layers. Rains and rivers now acted upon the scoriacious integument, grinding it down to sand and carrying it down to the depths and cavities."*

The object of giving this full and particular account of the "clear view" which geology gives them of the process of world-making, is to enable the essayist and his friends to show its utter contradiction to the Mosaic account of creation: He accordingly goes over the first chapter of Genesis, and gives his exposition of its meaning—the old Voltairean perversion,—and sums up thus: "That this meaning is, *prima facie*, one wholly adverse to the present astronomical and geological views of the universe is obvious enough. There is not a mere difference through deficiency. It can not be correctly said that the Mosaic writer simply leaves out details which modern science supplies, and that therefore the inconsistency is not a real but only an apparent one. It is manifest that the whole account is given from a different point of view from that which we now unavoidably take," etc.† This is a very fair specimen of this style of geological attack on the Bible. Some of our American writers are more scurrilous.

These evolutionists are not more respectful to their fellow savans than to Moses. If any astronomer, math-

* *Essays and Reviews*, p. 240.

† *Essays and Reviews*, p. 251.

ematician, or physical geographer, mildly suggests that their theory is contradicted by the facts of his science, they lose temper, abuse him, and puff themselves up like turkey cocks, and strut and fume in the following manner, the words being those of an eminent geologist:

"I should certainly not accept any mathematical result connected with geology if it were inconsistent with *our* mode of treating *our* subject. I would not accept a thousand, or even a hundred thousand millions of years, or any limit whatever imposed by physical science. I am just as incompetent to judge of the evidence on which *you* go as you are to judge of *this*."* Geology thus excommunicating all other sciences must in turn be expected to become unscientific. Accordingly Sir Wm. Thompson, at great length, irresistibly demonstrates that the present accepted theory of geology is unscientific and impossible, and that the claims of geologists to exclusive knowledge of the physical facts on which they base their theories, are presumptuous and inadmissible: "To get a superior limit to the possible deviation of something not very different from the present state of things on the earth, other sciences than geology must be appealed to; and here *because*, and *only because*, our scientific men are usually mere specialists, the natural philosopher is required. What can a geologist, as such, tell about the nature, origin, and duration of the sun's heat? Yet suppose it could be shown that ten million years ago the sun was very much hotter than it now is, would not that fact have an important bearing on the length of time during which plants and animals have inhabited the earth? What can he tell us about the internal heat of the earth, and the rate at which it is at present being lost? Yet if it could be shown, on strict physical principles, that ten millions of years ago the underground temperature was

*North British Review, No. C. p. 216.

at least that of red heat at a depth of one thousand feet below the surface, would not that materially influence his speculations? He may tell the mathematician to "mind his own business," but the mathematician must reply, "My business is in this case to save you from ignorantly committing egregious blunders, which not only retard the progress of your own science, but tend to render all science a laughing-stock to the uninitiated."

After going over the evidence which overturns the popular geology, he sums up thus: "Now here is direct opposition between physical astronomy and modern geology as represented by a very large, very influential, and, I may add, in many respects philosophical and sound body of investigators, constituting, perhaps, a majority of British geologists. *It is quite certain that a mistake has been made—that British popular geology at the present time is in direct opposition to the principles of natural philosophy.*"* Such testimony to the blunders of geology from the greatest living mathematician, must considerably weaken our confidence in the infallibility of these apostles of geological unbelief.

III. THE PREDICTIONS OF GEOLOGICAL PROPHETS.

The geological seers give us also clear views of the world's destiny. The direct and contemptuous denial of the Bible account of the destiny of our earth given by our geological prophets, is quite as remarkable as their contemptuous contradiction of the Bible narrative of its origin. The Bible presents us with a view of the origin of our earth from the waters; and of its final renovation by fire. The anti-christian development is precisely the contrary—the origin of our earth in the fire, the conquest of the elevating force by the water, and the gradual final cooling and freezing of our earth, the sun, and

*North British Review, No. C. p. 222.

all creation; and all this at a distance of almost infinite millions of ages. And all this is offered as "the determinations of exact science." How exact, it is hard to say, since no two calculations ever came within hundreds of millions of years of each other. Poisson proved that in the neighborhood of Paris the heat escaping from the earth was sufficient to raise the temperature of a column of water eighteen inches high, a degree and a half. Vogt, on the contrary, alleges that the existing temperature of the earth is but one twelfth of a degree higher than if the earth were cooled to the core. But Pouillet, from later calculations, affirms that the central fire communicates to the earth's surface one fortieth the amount of heat derived from the sun. And there are a dozen other contradictory calculations on the subject; all of which, however, are the "determinations of exact science."

But perhaps it is not quite fair to press prophecy too far with the determinations of exact science. Poetry and symbol are its appropriate drapery. The imagination of a geologist, inspired by the genii of the rocks, may be allowed to disport itself; and we may stand, astonished spectators of the grand panorama which displays the sublime destiny of the human race—the final issue of this grand process of the evolution of humanity. Truly

THIS EVERLASTING GOSPEL OF DESPAIR

is an awful conclusion of all the dreams of hero-worship, and godlike humanity, and conquest of the visible, and intercourse with the invisible worlds, with which we have been amused. The necessary degradation to bestiality is inevitable to the *eternal* progress of development. Here, however, we learn that the progress is not to be eternal; but that the irresistible power of cold will freeze out all life on our globe. This cheering prospect, however, must be portrayed by the pen of one of these men

of "exact science;" were any Christian to deduce such consequences from the theory he would be anathematized as a superstitious visionary: "Every year, and every day witnesses the dissipation of terrestrial warmth. While we ponder the great fact, the world is growing cold beneath our feet. The current of events is carrying us inevitably to a state of total refrigeration. Perhaps the mountains will have been leveled first, and the continents swallowed up in the sea."

"The nations of men, if they still exist, will have emigrated from the temperate to the equatorial regions. New diseases will have diminished their numbers. Polar frost will have crept stealthily and steadily from Behring's straits to the Gulf of Mexico. Continental glaciers will again have brooded over the land. The prairie blossom will have perished beneath a mantle of snow as limitless as are the prairie regions. The fluent rivers will have been chained to their rocky banks. The ruins of great cities will be bemoaned by wintry winds howling past in rage at the presence of unending frost. If yet a narrow belt maintains the desperate conflict with the powers of cold, it is a dwarfed and arctic vegetation. The magnolia has given place to the birch. The cypress has been supplanted by the lichen-covered fir. The emerald has departed from the shivering leaf, and even the hardy violet is pale unto death. All things have assumed a pale and leaden hue. The Mongolian is not known from the Caucasian. Even the sooty negro, if he be not extinct, blanched from the want of light and heat, can only be recognized by his features. Pale, thin, and feeble, the shivering remnant of humanity have gathered themselves together into compact communities for economy of vital warmth. Forests are consumed to thaw the soil. Temples —costly structures, the patient rearing of the golden ages of the race—are pulled down to eke out the scanty supply

of fuel. Men return to caves, whence they came in the beginning. Nature has become their enemy; science and art are forgotten. The page which narrates the glory of the nineteenth century is like the narrative which tells us of the labors of the men upon the plain of Shinar. Year by year the populations become less. Year by year the dead empire of frost is extended. Forests have been consumed; cities have been burned; navies have rotted in the deserted, ice-locked harbors; men have immured themselves in gloomy caverns till they have almost lost the forms of humanity. The end arrives. Unless some sudden catastrophe shall sweep the race from being in a day, the time will come when two men will alone survive of all the human race. Two men will look around on the ruins of the workmanship of a mighty people. Two men will gaze upon the tombs of the human family. Two men will stand petrified at the sight of perhaps a hundred thousand corpses prostrated around them by the dire hardships which every moment threaten to carry them also away. These two men will gaze into each other's faces; wan, thin, hungry, shivering, despairing. Speech will have deserted them. Silent, gazing each into eternity, more dead than living,—an overpowering emotion, an inspiring hope—and one of them drops by the feet of the sole survivor of God's intelligent race.

"Who can say what a tide of reflections will rush for an instant through the soul of the last man? Who shall listen to his voice, if he speaks? On whose ear shall fall the accents of his sorrow, his wonder, or his hope? Thrice honored, thrice exalted man! He stands there to testify for all mankind. On him has been devolved the unique duty of uttering the farewell of our race to its ancient and much loved home. In what words will he say farewell?

"The last man has composed his body to eternal rest.

The once fair earth is a cold and desolate corse. Nature's tears are ice. She weeps no more. The face of the sun is veiled. It is midnight in the highways of the planets. The spirits of heaven mourn at the funeral of Nature." *

Such is the millennium of evolution as described by its American Isaiah. It is even worse than Mr. Herbert Spencer's hell-fire for all creation. This long-drawn protracted misery of cold and hunger, described so eloquently by the Apocalyptist of Michigan, makes one turn, shivering with horror, away from this gospel of despair, back to the Bible. We shall allow it to speak in its own words, and listen as it unfolds to us the inspired

PREDICTIONS OF EARTH'S BRIGHTER DESTINY.

"Behold, I create new heavens and a new earth: and the former shall not be remembered, nor come into mind. But be ye glad and rejoice for ever in that which I create: for, behold, I create Jerusalem a rejoicing, and her people a joy." Isa. lxv. 17–18.

"We, according to his promise, look for new heavens and a new earth, wherein dwelleth righteousness." 2 Pet. iii. 13.

"And I saw a new heaven, and a new earth: for the first heaven and the first earth were passed away; and there was no more sea. And I, John, saw the holy city, New Jerusalem, coming down from God out of heaven, prepared as a bride adorned for her husband. And I heard a great voice out of heaven saying, Behold the tabernacle of God is with men, and he will dwell with them, and they shall be his people, and God himself shall be with them, and be their God. And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying; neither shall there be any more pain: for the former things are passed

* *Sketches of Creation*, by Alexander Winchell, LL.D., Professor of Geology in the University of Michigan.

away. And he that sat upon the throne said, Behold I make all things new." Rev. xxi. 1–5.

"And the city had no need of the sun, neither of the moon to shine in it, for the glory of God did lighten it, and the Lamb is the light thereof. And the nations of them which are saved shall walk in the light of it: and the kings of the earth do bring their glory and honor to it. And the gates of it shall not be shut at all by day: for there shall he no more night there. And they shall bring the glory and honor of the nations into it. And there shall in no wise enter into it anything that defileth, neither whatsoever worketh abomination, or maketh a lie; but they which are written in the Lamb's book of life. And he showed me a pure river of the water of life, clear as crystal, proceeding out of the throne of God and of the Lamb. In the midst of the street of it, and on either side of the river, was there the tree of life, which bare twelve manner of fruits, and yielded her fruit every month: and the leaves of the tree were for the healing of the nations. And there shall be no more curse: but the throne of God, and of the Lamb shall be in it; and his servants shall serve him. And they shall see his face, and his name shall be in their foreheads. And there shall be no night there; and they need no candle, neither light of the sun; for the Lord God giveth them light: and they shall reign for ever and ever." Rev. xxi. 23 to xxii. 5.

Take your choice, reader! You have now before you the evolutionist's anti-christian millennium of hunger, darkness, frost, and everlasting death; and on the contrary the Christian prediction of the kingdom of God on earth, the kingdom of light and plenty, of love and joy, and life eternal. Which is yours?

IV. SCIENTIFIC OBJECTIONS TO GEOLOGICAL EVOLUTION.

The geological theory of the development of this world by the cooling off of a lurid mass of molten matter, and its progression to the happy consummation of eternal congelation, when geologists, monkeys, and every other living thing shall have frozen to death, has been laid before the reader as the outcome of geological science, as interpreted by the latter-day apostles and prophets of atheism and unbelief.

A theory of such immense pretensions, and of such tremendous predictions, ought to be strongly supported, for every word of Professor Winchell's prediction is logically deducible from the theory of a cooling universe. Not only our earth, but our sun, and every sun in the sky, must, if that theory be true, at last become the prey of frost and death everlasting. But we deny the theory, and urge against it the following

SIX OBJECTIONS.

First, it is not proven; second, the advocates of evolution materially contradict each other, both as to the facts and consequences; third, it is contrary to all principles of steam pressure and hydrostatics; fourth, it is contradicted by the temperature of the ocean, and, fifth, the recent discovery of the aqueous origin of granite reverses the whole theory; and, finally, any theory founded in ignorance of the earth's interior, insults our common sense.

1. *The Logical Basis of the Theory will not Carry its Weight.*

Even were the facts granted, they would not prove the theory. One of the principal facts relied on, is *the spheroidal shape of our globe*, slightly flattened at the

poles, as would be the result had it been in a semi-fluid state when set to rotate. But it would have assumed the same shape had its fluidity been occasioned by water as by fire. A mass of mud would take the same shape under rotation as a mass of lava of the same consistence.

Another of the principal facts alleged for its support is the discovery of *tropical plants and animals in the lower strata of the earth*, in what are now temperate climes; whence it was inferred that the whole globe has cooled since the days of the coal plants.

But if it be granted that plants requiring equally great heat and moisture are now growing in the tropics, then the most that can be inferred is a change of climate. Besides, geologists are pretty well agreed that all the northern continents were once traversed by floating icebergs in the glacier period. It would be equally legitimate to infer from this that the earth is heating, rather than cooling, since those regions are now temperate.

Another, and perhaps the chief fact relied upon to prove the molten condition of the earth's interior at the present time is *the gradual increase of terrestrial heat as we descend into mines*, for the very short distance we can penetrate the earth. From this it is inferred that the same ratio of increase of temperature toward the centre prevails in the impenetrable depths, under unknown and totally different conditions of gravity, pressure, conduction, and electro-magnetism. It would be equally logical to invert the process, and argue that as atmospheric temperature diminishes in the sunshine, in the tropics, from the sea level to the snow line, 18° for every mile of ascent from the earth's surface, therefore the temperature of space one hundred millions of miles from the earth's mountain tops is not less than 1,800,000-000° below zero.

Sir John Herschel gives an illustration of the argument

which has all the force of a *reductio ad absurdum:* "Now only consider what sort of a conclusion this lands us in. This globe of ours is 8000 miles in diameter: a mile deep on its surface is a mere scratch. If a man had twenty great-coats on, and I found under the first a warmth of 60° above the external air, I should expect to find 60° more under the second, and 60° more under the third, and within all, no man, but a mass of red-hot iron. Just so with the outside crust of the earth. Every mile thick is such a great-coat, and at twenty miles depth, according to this rate, the ground must be fully red-hot," etc.* This is not written in ridicule of the theory; though there is not a ten-year-old boy who, on a wintry day, would not laugh at the notion of finding himself red-hot upon stripping off his coat, vest, etc., because while the air is at zero, the temperature under his great-coat is 60° Fahrenheit.

This mistake of the geologists reminds us of the similar miscalculation of the ancient Greek geographers; who, finding that the surface of the earth grew warmer as we approach the south, agreed that the heat would continue to increase as we approached the tropics, which must be uninhabitable from excessive heat. They had much better reasons for this conclusion than the geologists for their theory of the molten interior of the earth. The result in both cases, however, showed they were both reasoning from a very narrow range of facts, and that the *if*, which in each case they inserted into their proposition—*if* the heat continued to increase in that ratio—was utterly unfounded and erroneous. Every scientific theory which rests one end of the arch upon an *if*, must be merely hypothetical.

The existence of metals in veins of the rocks is adduced in proof of these metals having been vaporized by heat.

* *Familiar Lectures*, II.

There is not, however, the beginning of any agreement among geologists as to the manner or causes of the formation of these metallic veins, in which the wealth of the world is treasured. Werner alleges that they are formed by aqueous solutions filtered in from the top. Hutton affirms, with equal confidence, that they were filled by melted matter injected from the bottom. Sedgwick supposes they were produced by chemical separation of the materials while the rock was soft. Becquerel alleges that they were formed by electro-chemical action; and that he both makes and reduces ores in his galvanic battery, without the aid of mercury; which if true is a valuable discovery to miners. But Buckland suggests that the metals have been vaporized by intense heat, and the vapor has condensed in the veins. Geologists should agree among themselves on the causes of mineral veins before they bring forward their alleged causes as proof to the world.

Various attempts have been made to invest geological speculations of this sort with a quasi respectability by clothing them in mathematical reasonings, and algebraic symbols. Schmidt, Hopkins, and Zimmerman have pretended to *calculate* the nature and size of the rifts and mountain peaks and chains which the eruptions of a central molten sea would produce. As they hold the manufacture of all the elements of the problem in their own hands,—the depth of the inner sea, its density, the amount of its expansive forces, the thickness of the crust, the rigidity of its materials, etc.,—and may state them in any figures they please without risk of contradiction, they can, of course, make very pretty and elaborate calculations. But when competent scholars review these geological mathematics the following is their verdict, not more severe than well deserved, "A mature consideration of the subject will make us hesitate to ascribe much

value to the labors of those writers who have applied mathematical reasoning to geological questions. Such reasoning, when it is carried to the extent which requires symbolical processes, has always been, I conceive, a source, not of knowledge, but of error and confusion; for in such applications the real questions are slurred over in the hypothetical assumptions of the mathematician, while the calculation misleads its followers by the false aspect of demonstration. All symbolical reasonings concerning the fissures of a semi-rigid mass produced by elevatory or other forces, appear to me to have turned out valueless."* In this conclusion every man of common sense not pledged to a theory will heartily concur. Such calculations of a man's own fancies are most mathematically visionary.

If the facts alleged by geological evolutionists were all granted, they would by no means prove their theory of the igneous fusion of the earth.

2. *The Advocates of Geological Evolution Contradict each other's Statements of the Fundamental Facts of the Case.*

We have already seen that Mr. Herbert Spencer, from the very same facts adduced by the geologists, deduced a contrary conclusion, namely; that instead of the earth and the universe cooling down, it is now on the contrary heating up; and that the earth must fall into the sun and be burned up. Now the possibility of so learned an evolutionist as Mr. Spencer inventing a contrary theory is *prima facie* evidence of the absence of any sufficient proof of the other; and is, besides, a great encouragement to other inventors and manufacturers of theories. And this method of mutual contradiction extends through all the system.

The great objection to the "clear view" of the igneous

* Whewell's *History of the Inductive Sciences*, Vol. II. p. 557.

nucleus of the earth is, that we can not get any consistent view of it at all, neither past nor present. We can not get any agreement among our philosophers either as to its present condition or size, much less as to its former heat.

THE DISAGREEMENTS OF GEOLOGISTS.

The time necessary for our earth to cool down from its molten condition to a state fit for plants to grow, has been accurately determined by M. Unger, from experiments on the cooling of basalt, at nine millions of years; but M. Hibert, with equal accuracy, fixes it at five millions, and M. Bove, with equal certainty, at three hundred and fifty millions. The period which has elapsed since, is fixed with scientific certainty by each geologist to suit his own taste. Poisson, however, alleges that the heat of the earth is merely a consequence of the motion of our planetary system in space; of which some parts have more stellar heat than others. He denies that the centre of the earth is any hotter than the surface; alleging that, even on the hypothesis of a molten cooling globe, the solid parts first cooled would sink to the centre.*

The same want of agreement as to the rate of increase of the terrestrial heat, prevails between the observers in different localities. The mean rate in six of the deepest English mines is 1° for every forty-four feet. In the silver and lead mines of Saxony it was found to be 1° Fahr. for every sixty-five feet; but in other mines it was necessary to descend three times as far for each degree of temperature. Mr. Fox, in the Dalwath mine in Cornwall, found the increase 1° for seventy-five feet. Kupfer gives the result of his researches as 1° for every thirty-seven feet. Cordier asserts that the rate varies in different countries, averaging 1° Fahr. for every forty-five feet. At the experimental well of Grenelle, it was found

* *Cosmos*, i. p. 165.

to be 1° Fahr. for every sixty feet, at a depth of thirteen hundred and twelve feet.* Such discordant results can not proceed from one uniform cause. They point, not to one central and uniform, but to many local and various, sources of heat.

There is another series of facts which shows decrease of temperature as we descend to the deep places of the earth. Thus the water of the Artesian well of Chicago, from a depth of 700 feet, which should, according to the igneous nucleus theory, be fourteen degrees warmer than the average surface temperature, is, on the contrary, two degrees below it.† The Artesian wells of St. Louis, and of other places in the valley of the Mississippi, exhibit similar decrease of temperature at considerable depths.

Geologists give equally contradictory accounts of the causes of the great convulsions of nature. The defenders of the interior lake of fire allege the phenomena of earthquakes and volcanoes, as proof that the crust of the earth rests uneasily upon a fluid, as ice upon the water in a spring thaw, and allege that this is the only sufficient explanation of the phenomena of earthquakes, of volcanoes, and of the upheaval of mountains and continents in one place, and their subsidence in others. This, however, is only one of half a dozen theories of the cause of earthquakes. Gay Lussac produces all the phenomena of earthquakes and volcanoes, by pouring sea-water through the clefts of the bottom of the sea into the interior of the earth, thus oxidizing the metalloids of the earths and alkalies, and producing an intense heat chemically. The eructations and steam pressures thus excited, produce earthquakes in the overlying strata, and the upheaval of mountain chains, leaving vast cavities behind them to be filled with water and gases;‡ and Lyell alleges this as a sufficient cause of

* Lyell's *Elements of Geology*, chap. xxxi.

† *Annual of Scientific Discovery*, 1867, p. 256.

‡ *Cosmos*, 5. 170.

the volcanic phenomena.* Boussingault manufactures both mountains and earthquakes by the cold process; he simply piles up his mountains loosely of sharp-edged fragments, like piles of gigantic brick-bats, which, settling and falling in from time to time, produce earthquakes. He omits to inform us, however, how this sinking process can raise mountain chains from ten to forty feet, along hundreds of miles, in a single night. Nor does he explain how such a process projected the bodies of the unfortunate inhabitants of Riobamba across the river Lican, and threw them to Cullea, over a hill several hundred feet above the former city.† Other scientific authorities show that mountains have been crushed up while soft, and appeal to the plication of their strata. But Ruskin has found vertical strata, in Savoy, made by cleavage. Humboldt proves that mountains have been elevated bit by bit, by earthquakes; which Mallet denies and shows to be utterly impossible.‡

DIFFERENT PROCESSES OF MOUNTAIN MAKING.

These three processes of mountain-making—by melting, by boiling, and by crumbling—are equally scientific, and equally certain. Chambers, however, says of them all: "The many proposed theories of mountain elevation are based upon assumptions which, unfortunately, are not true; but that is an unimportant matter to the majority of our speculative geologists, and one never seen by the inventors of the theories, who allow themselves to be led captive by a poetic imagination, instead of building their inductions on field observations. Thus to suppose that mountains are elevated by a wedge-like intrusion of melted matter is to give to a fluid functions incompatible with its dynamic properties. So, also, the supposition that the igneous rocks were intruded as solid wedges

* *Principles of Geology*, ch. xxxii. † *Cosmos*, 5. 172. ‡ *Annual*, 1864, 215, 222.

separating and lifting the crust, is opposed to the fact that no apparent abrasion, but generally the closest adhesion, exists at the line of contact of igneous and stratified rocks. Equally fatal objections may be urged against the other theories."*

The constant existence of a sea of molten metals, at one uniform, or uniformly decreasing temperature, is not a sufficient cause for the irregular explosions of volcanoes, and the perturbations of certain limited localities by earthquakes. These occasional and local phenomena do not indicate any general and constant, but rather occasional and local causes.

Mr. David Forbes, however, argues that these convulsions are produced by the boiling up of the mass in spots, thus bursting up through the crust at those places. This would be a phenomenon, not at all of a cooling fluid, but of one growing hotter under the increase of heat. Mr. Poulett Scrope, on the contrary, argues that the interior of the globe is solid because of the weight and pressure constantly surrounding it; but that the interior solid is highly expansible, and ready to fly off when the internal heat has generated steam enough to force a way to the surface."† This also, it will be observed, implies not a cooling, but a heating process. In a previous chapter we have referred to the new theory of the solar system as a heating process. There is no *science* amidst such contradictions.

In this unfortunate state of confusion, with the mountains upheaving they know not why, and threatening to tumble on the heads of European geologists, an American writer, Prof. James Hall, steps in with an original process of mountain-making by water power. The oceans of ancient times deposited strata higher than the highest

* *Chambers' Cyclopædia*, Article *Appalachians.*

†*Chambers' Journal*, 1869, 559.

mountains, their currents scooped grooves and channels into the soft mud, now hardened into rocks, and the ridges left between these channels are the mountains. He accounts for the plications of mountainous strata by the unequal subsidence, and consequent unequal pressures, of the various materials. His theory seems perfectly adapted to the mountains of this continent.* If it be in any good measure reasonable, and many of our scientific men seem to think that it is, it totally removes the presumption in favor of an internal molten nucleus arising from the elevation of mountains and the plication of their strata. In any case, it is an illustration of the utter contradiction of geological theories in regard to the fundamental facts of their systems. There can be nothing deserving the name of *science*—something actually known—where such contradictory theories are bandied, supported and abandoned, by geological evolutionists, as their humors happen to vary.

The most diverse statements are made as to the size, tides, and heat of the internal sea of fire, and consequently about the thickness of the solid crust which we call our real estate. It was alleged by some that, as we find the heat increase a degree for every fifty-seven feet we sink into the earth, it must be hot enough at twenty-four miles to melt cast-iron. Lyell gives the depth in miles; but Humboldt, a man of correct measurement, gives it in feet—121,500. This melting point of iron, however, strange to say, is quite as undetermined as the rest of the business; according to Wedgwood's pyrometer, which was the infallible standard twenty years ago, it was 21,000° Fahren.; but Prof. Daniels has constructed another infallible instrument which says 2786° Fahren. exactly; while in the meantime, Messrs. St. Clair, Deville, and Troaste have invented a new instrument which alleges that at 1530°

* *American Cyclopædia;* Article, *Geology.*

C. copper and silver are vaporized.* This would make a slight difference in the thickness of the crust, which in the one case would be twenty-four, and in the other two hundred miles thick. But Hopkins comes in and demonstrates that with any such pressure of superheated steam or gas, two hundred miles of half-melted granite would explode faster than a steamboat boiler of stove-pipe iron; and he demands at least eight hundred or a thousand miles of good solid rock. Having measured and weighed the earth and the stars by the pendulum, he alleges we have a good title for our city lots at least a thousand miles down.†

Cordier calculates the interior heat at 450,000° Fahren., or about one hundred and sixty times that of melted iron. But it is well known to be impossible to raise the temperature of water much above the melting point, while a piece of ice remains floating in it. Every foundryman knows that the same principle prevails in melting metals; the temperature can not be raised much above the melting point while a pig of lead is floating in the crucible. A sea of boiling water at 212° Fahren., covered with a crust of ice twenty-four miles, or eight hundred miles thick, at 32° Fahren., would be a dream six hundred times less preposterous than a sea of molten minerals, at 450,000° Fahrenheit, floating a solid crust at less than 100° Fahren. The alleged phenomena of the solidifying of a crust of cooling lava are irrelevant, since the proportion of cooling surface to the mass is so immensely different. The state of lava in the crater during an eruption is the correct illustration, and it speedily melts all extraneous substances.

So weighty do these objections and contradictions seem even to Spencer, that he is obliged to give up the molten

* *Annual of Scientific Discovery*, 1867.

† Lyell's *Principles of Geology*, p. 538.

nucleus notion, and to fill the hollow sphere with gas. "Irreconcilable as appear the astronomical and geological facts, if we take for granted that the earth consists wholly of solid and liquid substances, they become at once reconcilable if we adopt the conclusion that the earth has *a gaseous nucleus.* If there is an internal cavity of considerable diameter occupied only by aëriform matter—if the density of the surrounding shell is, as it must in that case be, greater than the current supposition implies,"* etc. Thus he would make the shell both thicker and heavier than is generally supposed. In this he is supported by the philosophers of India, who locate hell under the northern extremity of their continent, and have ascertained the depth to be five hundred *yojanas*, say five hundred thousand miles!

We are compelled to conclude that these contradictory conclusions proclaim complete ignorance of the subject. This conclusion is very tersely put by Whewell: "Speculations concerning the causes of volcanoes and earthquakes, and of the rising and sinking of land, are a highly important portion of this science, at least as far as the calculation of the possible results of definite causes is concerned. But the various hypotheses which have been propounded on this subject can hardly be considered as sufficiently matured for such calculation. A mass of matter in a state of igneous fusion, extending to the centre of the earth, even if we make such an hypothesis, requires some additional cause to produce eruption. The supposition that this fire may be produced by intense chemical action between combining elements, requires further, not only some agency to bring together such elements, but some reason why they should be originally separate. And if any other causes have been suggested, as electricity or magnetism, this has been done so vaguely

* *Illustrations of Universal Progress*, p. 291.

as to elude all possibility of rigorous deduction from the hypothesis." *

Yet on this utterly unproven hypothesis, as we have seen, not only skeptics, but clergymen of the Church of of England, and eminent American preachers, base their denial of the Bible account of creation.

3. *The Notion of an Ocean of Molten Metals in the Interior of the Earth is Contrary to all the Principles of Hydrostatics and of Steam Pressure.*

We have seen the demand of Hopkins for 800 miles thickness of the crust of the earth—though how he could get it without abandoning the theory of the increase of heat a degree for every fifty feet did not appear; but our evolutionists are ever ready to manufacture facts to suit their theory, so we let Hopkins have his 800 miles of crust. We were beginning to breathe more freely over the increasing firmness of our real estate, and the consequently firmer security of our institutions, produced by the thicker crust, when we met some coal-begrimed, hard-handed mechanics—a class of men who have as little faith in Murchison as in Moses, who do not care a cent for science more than for Scripture, and who ask no better fun than to hunt down a philosophical humbug. They speedily demonstrated, beyond contradiction, that if a boiler full, either of superheated gas, or of any liquid ready to flash into vapor on the removal of pressure, should be pierced with openings like the craters of volcanoes, every ounce of gas, lava, or steam would be as infallibly driven out, as the water from the boiler of the Essex when it was riddled by the Confederate guns, no matter what might be the thickness of the boiler. The objection is utterly unanswerable. The earth could not exist one hour under any such conditions as this geological theory demands.

That there is water enough to get up steam even in

* *History of the Inductive Sciences*, II., 554.

the depths of the abyss is undeniable. Hitchcock proves that lava consists in part of water, and owes its fluidity to the water mixed in it. * Since the heat is not great enough to melt the rocks without it, ejections of steam and of mud are common volcanic phenomena. Thus the interior of the earth would be, according to this hypothesis, a steam boiler with a pressure of several thousand atmospheres, *full of holes, and yet not blown off!* The most ignorant deck hand of a steamboat must see the utter absurdity of such a notion.

But there arises the previous question, How could a crust of twenty miles thick of half-melted rocks withstand the pressure of superheated steam, when less than the heat necessary to melt iron will raise steam pressure of over 500 pounds to the inch over the whole interior surface of the globe. Our best mechanics can build no boiler able to withstand that pressure, save of tubes less than two inches diameter. But here we have

A BOILER MADE OF CROCKERY

of 8000 miles diameter, composed of clay and stone twenty miles thick—or one four-hundredth part of its diameter —standing a pressure of 500 pounds to the inch! Let any engineer imagine a steam boiler made of earthenware sewer-pipe, eight feet four inches in diameter, and only a quarter of an inch thick (which is just the same in proportion), standing a pressure of 500 pounds of steam to the inch! A boiler of such material and size could not stand its own weight. It would collapse on the sidewalk, before it could be mounted over the fire. And could a boiler of any such stuff, ten times or twenty times as thick, stand such a pressure? The Irishman who bolted his door with a boiled carrot was an intelligent engineer, compared with the evolutionists who get up

* *Geology*, 212.

steam 500 pounds to the inch pressure, in a boiler of half-melted granite.

Other absurdities and impossibilities of the interior metallic sea manifested themselves to minds capable of contemplating geology and terrestrial and celestial dynamics. It was seen that *our earth could not possibly exist for the period of three springtides with such an interior ocean.* Of course, if there is a sea of melted granite of six thousand miles diameter inside the earth, it must obey the laws of fluids, and be subject to tides. Poisson says these would rise and fall only fourteen inches; but Ampère, an equally scientific man, declares "the moon's action would produce tides analogous to those of our seas, but far more terrible, both from their extent and from the density of the liquid. It would be difficult to conceive how the envelope of the earth could be able to resist the incessant attacks of a sort of hydraulic ram fourteen hundred leagues in length."

Moreover, the astronomers have demonstrated the impossibilities of the fluid nucleus. La Place long ago showed that if the earth has been cooling, it must have been contracting also, and so the day must have been shortening; but the day has not shortened by one three-hundredth of a second in two thousand years. Prof. Wm. Thompson, in a paper on *The Rigidity of the Earth*, presented to the Royal Society, May 15, 1862, from the established doctrine of the precession of the equinoxes, demonstrates that there can be no such molten and liquid interior of the earth as geologists dream of. He further showed that unless the solid portions of the earth be, on the whole, more rigid than steel, it must yield to the attractions of the sun and moon in such a way as very sensibly to diminish the oceanic tides. "But in order to this result the interior must be even more rigid than the superficial parts; and this is just what might be expected

if—the interior being solid—the enormous pressure upon it be taken into account." *

"The report of the Tidal Committee of the British Association, read at its annual meeting, contained an interesting passage with regard to the degree of elastic yielding which the solid earth experiences under the tide-generating influences of the sun and moon. It is quite certain that the solid earth does yield to some degree. It has long been a favorite assumption of geologists that the earth consists of a shell of solid rock from twenty to fifty miles in thickness, inclosing an interior filled with melted material, lava, metals, etc. This hypothesis is now shown to be absolutely untenable, because, if it were true, the solid crust would yield with almost as much freedom (on account of its thinness and great area) as if it were perfectly liquid. Thus the boundary of the solid earth would rise and fall under the tide-generating influences, so as to leave no sensible differences to be marked by the water rising and falling relatively to the solid; showing that if the earth, as a whole, had an average degree of rigidity equal to that of glass, the tides would be very much diminished from the magnitude which they would possess on a perfectly rigid globe, with water like that of our seas upon it. This consideration, the committee reports, makes it probable that the earth has considerably more average rigidity than a globe of glass of the same size. The mathematical calculation shows a somewhat startling result, to the effect that a globe of glass of the same size as the earth, if throughout exactly of the same rigidity as glass on a smaller scale, would yield like an India rubber ball to the tide-generating influences, thus leaving very little opportunity for change in the relative heights of water and land." †

* *American Cyclopædia*, 1862, p. 392.

† *The Times*, London, cited in *The Chicago Evening Journal*, Sept. 1, 1871.

4. *The Temperature of the Ocean is a Conclusive Demonstration of the Non-existence of any such Subterranean Fire under its Bottom.*

If you put a good fire under a kettle of water, it will boil; and if you put a good fire under the ocean, and keep it up long enough, it will boil, too,—just as surely as the kettle on your cooking-stove, only it will take a longer time. But the geologists are liberal both with time and fuel. Given the temperature of the water, its depth, the area of the heating surface of the boiler, and its temperature, and, with a piece of chalk on the nearest fence, any steam engineer will speedily calculate, by the aid of familiar formulæ, how long he will be in getting up steam, and how long after that in evaporating his boiler dry. The size of the boiler does not make the slightest difference in the principle of the calculation, but only in the time of the operation. With a good fire the ocean will boil in due time; and according to the geologists we have a fire that should boil it in a very short time—less than an hour for every foot of its depth!

The Atlantic Ocean has been ascertained to be 7700 fathoms, or 46,200 feet deep, by Captain Denham, of H. M. S. Herald, sounding with an American line furnished him by Commodore McKeever, midway between Buenos Ayres and Tristan de Acunho.* Repeated casts with shorter lengths, of five and six miles of line in various places, have found no bottom, neither in the Indian, the Atlantic nor the Pacific Oceans. According to the geological scale of average increase of temperature towards the centre, of 1° F. for every forty-five feet, the temperature of the bottom of the Atlantic Ocean would be 1026° F., hotter than the average temperature of the land at the sea level, since the pit in which the ocean lies is forty-six thousand feet nearer to the central fire. This

* *Eclectic Magazine*, 1869. Vol. x. 85.

heat is that of a good steamboat-boiler wood fire; far more than sufficient to have brought the ocean to the boiling point ages ago, and to have evaporated it all into steam, and to keep evaporating it, as fast as it fell back, condensed into rain. No ocean, in fact, could exist if there were now such a fire under it.

This objection cannot be answered by assuming that the ocean lies, not in a hollow excavated out of the thickness of the earth's crust, but in a pocket, or fold of the crust of the average thickness, let down into the interior sea. This would be contrary to the first principles of hydrostatics. The interior substance is five-and-a-half times heavier than water, and much heavier than any known rocks; and the lighter body cannot sink into the heavier. You might as well try to sink a tea-kettle of water into the molten iron of a furnace.

Neither can the difficulty be obviated by supposing that the superheated sea bottom has been cooled off by the ocean, since the only way in which the ocean could cool it off is by receiving the heat itself, and so becoming heated until the sea bottom and the water became uniform in temperature. Whatever might have been the earth's temperature at the sea leavel, that of the sea bottom at the same period must, according to the theory, have been a thousand degrees higher; and as the increase of the interior temperature is claimed as a constant fact, both then and now, the ocean must always have been boiling and evaporating, and should be boiling and evaporating now.

Another evasion of this difficulty is by asserting that the ocean bed is generally shallow, so as to present a large cooling surface with a comparatively small part of the bottom exposed to such intense heat. If that were the fact, it would not invalidate the argument; since we see how readily a small coil of iron pipe filled with water, at the back of a cooking-stove no warmer than the alleged

temperature of the earth at a depth of forty-six thousand feet, will raise the water of a large bath-room boiler to 212° F., the boiling point. But there is no reason to believe that the Indian Ocean, and the Pacific Ocean, are shallower than the Atlantic. They are certainly more than five miles deep, since soundings at that depth over great areas, have failed to find bottom. The discovery of the Atlantic cable plateau, a submarine mountain or elevated plain, extending from Ireland to Newfoundland, with deeper water on each side, is confirmatory of the general depth of the deep sea. Even the shallower soundings of from three to four thousand fathoms repeatedly taken on each side of this plateau, at the geologists' rate of increase of heat with depth, demand a temperature very far above the boiling point. Such a fire below it would keep the ocean always boiling.

The deep sea soundings made in the Atlantic prove that the bottom of the ocean, in those places where we can reach it with registering instruments, is not merely not warmer than the surface, but *actually and uniformly colder.* Thus the report of Lieut. Walsh, of the U. S. Schooner *Taney*, of soundings in the Gulf Stream, shows: May 14, surface 77°, at 1050 fathoms 49°; May 13, surface, 77°; at 50 fathoms, 76°; 100 fathoms, 74°; 500 fathoms, 53°.* Repeated dredgings at 14,000 feet have brought up hundredweights of mud full of *living animals;* while the instruments registered from 30° to 43° F. on the ocean floor, utterly contrary to the theory. The temperatures of the ocean's floor, down even to the freezing point, demonstrate that there is no such fire beneath it as this theory asserts.

5. *The Discovery of the Recent Origin and Aqueous Formation of Granite Completely Reverses the Theory of Geological Evolution.*

* *Annual of Scientific Discovery*, 1851, 266.

It has been customary for Christians to deny the charge of the contradiction of Scripture by science, by alleging that the Bible teaches no system of geology. The ancient Hebrew interpretation of the first chapter of Genesis, twenty centuries ago, before geology was dreamt of, is, that the first verse describes the original and most ancient creation of the substance of heaven and earth; the second verse an indefinite period of chaos, and subsequent aqueous deposition under the wings of the brooding Spirit; and then with the six days' work the arrangement of the earth's surface, and of the visible heavens for man's accommodation. Until modern Europeans and Americans shall prove themselves more competent Hebraists than the men who interpreted their *own mother tongue*, this exegesis will stand; and with it the refusal of the Author of the Bible to commit himself to any scientific theory. But the question of the agreement or disagreement of the Bible with the current theory of igneous geology need not any longer concern us, since the discoveries of the last few years have shown the error of the fundamental assumption of the whole system, the igneous origin of granite and similar rocks.

Of this discovery, so important in its consequences, the evolutionists are most industriously silent. They cannot deny it, but they dare not admit it without ruining their theory; so they affect to ignore it, as of no great consequence. It is therefore necessary to note the progress and bearings of this great revolution in geology.

It began by the confessions of some leading geologists of ignorance of the earth's interior. Emancipated by these confessions of ignorance from the scientific pretensions of the world-makers, the advanced geologists set themselves to discover, by their own observations, the condition of the earth's nucleus. In this process they stumbled upon a discovery which has revolutionized the

whole structure of speculative geology—the discovery that granite is not an igneous rock at all, but is of aqueous origin, a mortar baked and hardened by heat, like any other metamorphic rock; and then the necessary consequence of this, that instead of the granite furnishing the materials of the stratified rocks, these furnished the materials of the granite. In a word, the process of world-building is the very reverse of that imagined by our anti-Bible geologists. The controversy is like that between two sets of inductive philosophers, investigating one of the old brick-kilns of Egypt; one set, finding a layer of brick earth, and some bricks weather-worn with the action of centuries, set themselves to calculate how many millenniums the bricks had been crumbling down into clay; the others alleging that they were in possession of facts proving that the clay was not made by crumbling down the bricks, but that the bricks were baked out of the clay. The mode of this discovery was purely scientific and experimental, and its results are so far-reaching and instructive that we shall follow it step by step. It is the result of an accumulation of facts, by different observers, for a series of years, all bearing in one direction, and capable of only one interpretation; which interpretation has been given by the acknowledged leaders of geology, and can no longer be refused by those whose science is only the second-hand utterance of their discoveries; namely, the fact that granite is an aqueous formation.

The process of this discovery was on this wise: The younger geologists, believing that the substances ejected by volcanoes were derived from the lowest depths to which man would ever have access, began to collect and analyze volcanic products,—gases, waters, and minerals. To their surprise they found that these consisted simply of the constituents of sedimentary rocks, frequently of large quantities of these rocks themselves in a half-melted

state, and, in several cases, of immense quantities of the shells of infusoria, and even of fish and pine twigs.* It was quite evident there was no igneous fusion of granite down there, else the shells would have been burned; and in some cases not even heat enough to broil fish, or to burn pine twigs.

Then followed the discovery that granite, which was called a primary rock, was really much more recent than either those called secondary or tertiary. The facts were long known before geologists would admit their consequences. Granite, it was known, had upheaved and tilted secondary, and even tertiary, strata; yet geologists persisted in calling it the *primary* formation. At length granite was found over-lying, and even penetrating, tertiary strata, in Jamaica;† proving itself thereby to be a younger rock than the tertiary; and geologists then began to open their eyes to the great fact that, so far from this being an exceptional case, the general rule is, that granite is *not* more ancient than the tertiary strata.

Bakewell has demonstrated the fact that not only local overflows of granite, but even whole mountain ranges of this material, are more recent than the surrounding strata. "If we date the age of granite from the period of the elevation of granite mountains, we must admit that some granite mountains are comparatively recent, for they have been elevated since the deposition of the secondary strata. I have shown this to be the case with the Bernese and Savoy Alps, in my Travels, published in 1827. In the edition of my work in 1828, I have shown also, by a description and sections, that the elevation of the granite of Savoy is more recent than that of the central part of England. M. Elie de Beaumont has since adopted the same views, and has extended them to other

* *Cosmos*, vol. 5, p. 237.

† *Annual of Scientific Discovery*, 1863, p. 272.

mountain ranges. Professor Sedgwick and Mr. Murchison have further proved, that a part of the Tyrolean and Bavarian Alps was elevated since the deposition of the tertiary strata, for these strata are filled up with them to the height of several thousand feet."* So instead of granite being, as geologists called it, the primary rock, it is really a later rock than either the secondary or the tertiary. This he further proves by another evidence: "If they (the granitic rocks) are partly covered by secondary or tertiary beds which are tilted up with them, we have direct evidence that the date of their elevation was posterior to the secondary or tertiary epoch." This evidence exists in great abundance; indeed the general rule of mountain ranges is, that the exterior strata dip, or are tilted by, the intrusion of the granite. I quote the statement of Phillips,† which no geologist will question: "It is a general law, confirmed by most ample evidence, that the interior parts of mountainous regions consist of granite and other pyrogenous rocks, rising from below all the strata, and bearing them up to their present elevations. From these elevated points and lines, both the subjacent igneous, and the superior stratified rocks, descend at various angles towards the plains and more level regions, beneath which they sink and pass at various distances, until they again emerge in some other mountain groups having similar characters. In consequence of this arrangement, it happens generally that the oldest strata, those which sink deepest under the plains, rise highest against the mountain slopes. . . . The most constant of all facts connected with this part of the subject is the development of granitic, or some other pyrogenous rocks, about the centres of the elevated groups from beneath all the strata there occurring." The granite is in fact an

* *Bakewell's Geology*, p. 101.

† *Guide*, p. 31.

intruder, shouldering his way among the foundations of the hills, and very unceremoniously heaving over the quiet and orderly slates, and limestones, and sandstones, which had taken up housekeeping there.

These intrusions of the granite have taken place again and again, even since the existence of our present races of animals, such as the ox and the deer; and for anything we can tell may be going on at this moment. De La Beche tells us: "Thus the volcanic mass of the Plomb du Cantal appears to have burst through and fractured and upset the fresh-water limestones of the Cantal, which, according to Messrs. Lyell and Murchison, may be equivalent to the fresh-water deposits of the Paris basin, and to those of Hampshire and the Isle of Wight.

"The fossil species are very numerous, consisting of elephant, mastodon, hippopotamus, rhinoceros, tapir, boar, felis, hyena, bear, canis, castor, hare, water-rat, deer, and ox." *

Lyell confirms this assertion: "The same phenomena are exhibited in the Alps on a much grander scale; those mountains being composed, in some even of their higher regions, of newer secondary formations, while they are encircled by a great zone of tertiary rocks of different ages, both on the southern flanks, towards the plains of the Po, and on the side of Switzerland and Austria, and at their eastern termination towards Styria and Hungary. This tertiary zone marks the position of former seas or gulfs like the Adriatic, which were many thousand feet deep, and wherein masses of strata accumulated, some single groups of which seem scarcely inferior in thickness to the whole of our secondary formations in England. These marine tertiary strata have been raised to a height of from 2000 to 4000 feet, and consist of formations of different ages, characterized by different assemblages of

* *Manual*, p. 241.

organic fossils. The older tertiary groups generally rise to the greatest heights, and form interior zones nearest to the central ridges of the Alps. We have already ascertained that the Alps gained accessions to their height and width at several successive periods, and that the last series of movements occurred when the seas were inhabited by many existing species of animals."*

The same order prevails in all the great mountain ranges of the world. The Andes and the Himalayas have the same general arrangement as the Alps and Pyrenees, —the granite near the centre intruding into and upheaving the older tertiary and secondary rocks overlying it. So Phillips informs us that all known granite is recent: "No truth is more certain or important in geological reasoning than the formation of all our continents and islands by causes acting below the sea. As far as relates to the stratified rocks, this is obvious; but it is not less certain for the unstratified rocks, those having been undoubtedly uplifted to our view from beneath the strata. It is possible there may yet be found *some* granite rocks which were raised above the general spherical surface before the production of any deposit from water, which therefore may be presumed to form an exception to this general rule; but such truly primitive rocks have nowhere been seen, nor is there any ground of expectation that they will be discovered."† This ends the primeval granite-grinding business, for want of grist. Of course the strata could not have been ground down out of granite which had never showed its head above either earth or water. Granite, then, instead of being the oldest, is the youngest of all the rock formations.

Hitchcock adduces another fact fatal to the theory of the origin of granitic rocks from a uniform central melted

* *Principles of Geology*, pp. 124, 119.

† *Phillips' Geology*, vol. II. p. 248.

mass, namely, the variety of their composition: "If the unstratified rocks were all derived from the same melted mass in the earth's interior, we should suppose they would not differ from each other at any period of their eruption. But in fact they do so differ as to show, first, that the ingredients from which they were derived were different; and secondly, that the circumstances under which they were formed, as to temperature, fusion, and pressure were different." *

Next followed the discovery that all the constituents of granite existed in the sedimentary rocks, and could be actually manufactured out of them.† Then, in the progress of exploration, water-marks were discovered in mica schist, heretofore regarded as an igneous rock, and fossils were found in other so-called plutonic rocks.‡ Then the discovery of graphite in granite was declared by eminent chemists inconsistent with melting heat. "The presence of graphite (black lead) in granite, gneiss and diorite," says an eminent chemist, "has renewed the dispute between the neptunists and the plutonists. Graphite is known to be nearly pure carbon, for it leaves in burning but a very small quantity of ash. Now, if these primitive crystalline rocks are of igneous formation, it is impossible to explain how graphite could co-exist with silicates of protoxide of iron, without having reduced these salts; judging merely by what takes place in blast furnaces, since carbon reduces all oxides of iron at a high temperature. It must then be admitted that granite, gneiss, and diorites did not contain graphite when the mineral elements of these rocks, such as mica, hornblende, and other silicates were in a state of fusion. Graphite, then, must have been subsequently introduced into these

* *Geology*, p. 92.

† *Annual of Scientific Discovery*, 1861, p. 279, and 1865, p. 312.

‡ Ibid. 1864, p. 241.

rocks; but when and how? Questions like these are difficult to answer. The most plausible hypothesis is by the wet way into the crystalline rocks, and substituted for one of the mineral components. Thus in the gneiss of Passan it takes the place of mica."*

Then came the discovery of magnetic iron ore in plutonic rocks, and even of fossils. "At the recent meeting of the London Geologists' Association, Mr. Tomlinson, after adverting to the close resemblance or identity of the slags and dross of iron furnaces with naturally-formed volcanic rocks—as lava, pitch-stones, etc.—stated, that while we may regard the plutonic origin of such rocks as certain, it should be borne in mind that volcanic rocks formed but a small proportion only of the rocks termed plutonic, or fire-formed. All granites, and certain porphyries, were generaliy regarded as fused by such action at great depths. But as many of these rocks contained magnetic iron ore they could not be the results of fusion, else their composition would be that of a vitreous, instead of a crystalline, rock. In cooling, quartz and iron would not separate, the oxides having a strong affinity for silica. Another difficulty which presented itself to the mind of the plutonist was, that fossil forms were occasionally met with in magnetic iron ore; as the Devonian Brachiopod *Spirifer Speciosus*, which was thus found in a quartz rock mixed with iron pyrites. Such facts pointed more to a neptunistic than to a plutonic origin for granite, quartz, and other allied rocks."

The same conclusion results from a comparison of the specific gravity of quartz with feldspar. The quartz being the heaviest must have sunk to the bottom of the molten mass, as water sinks through oil; and we should find it, not scattered in crystals through the granite, but all in one mass at the bottom. Accordingly we find Von

* *London Chemical News*, cited in *Annual of Scientific Discovery*, 1865, p. 219.

Fuchs deciding absolutely against the igneous theory. "He reasoned against the view that the crystalline rocks were once in a state of fusion, as follows, using granite as an illustration: If granite were once in a molten condition, then, as it cooled, in the first place, quartz must have crystallized out, and would have sunk down through the still molten mass, while feldspar and mica must have crystallized at a much later stage of cooling, as the necessary consequence of their different degrees of fusibility. Further, the inclusion of arsenical pyrites, sulphide of antimony, tourmaline, garnet, fluor spar, etc., by quartz is incompatible with the crystallization of the latter from a state of igneous fusion. He proceeds to show that amorphous must precede crystalline rocks, and that originally the solid part of the earth consisted of silica and silicates in the amorphous form, while the liquid portions were largely made up of solutions of lime and magnesia, and their carbonates."* This is merely a translation of the second verse of Genesis into scientific language.

Thus far the steady progress of discovery was an accumulation of facts disproving the igneous formation of the crystalline rocks, under known chemical and mechanical conditions, against an unproved assumption that granite was an igneous formation. Not a single fact supporting the assumption had ever been presented, save our ignorance of the interior of the earth, and the assumption that every thing must be melted by extreme heat down there. Attempts were made, however, to imitate the subterranean conditions of heat under pressure. Experiments were made to ascertain the effect of pressure on melting bodies; and it was found by Hopkins that immense pressure prevented their melting, unless at greatly increased heats. Next, experiments were made

* *Annual of Scientific Discovery*, 1858, p. 301.

by Daubree, and others, to melt quartz by igneous fusion, which settled forever the question as to the heat of the melting point in the simplest manner; namely, that it would not melt at all, but that its crystals would decompose, and the mass become lighter in the fire, as all clayey substances do; or, where there was sufficient alkali, would form a black glass, of quite a different structure and specific gravity from granite.* The product of the igneous fusion of the materials of granite is not granite at all, any more than the ash and cinder of coal is coal, or than a glass tumbler is silex. It is a different substance.

Dr. Percy, of the London School of Mines, in a recent lecture, objected to the assertion of geologists that granitic rocks must have been formed by plutonic agencies; for, said he, "There are certain difficulties which have always stood in the way of accepting this view of the subject—difficulties known to those who have been accustomed to make experiments on the fusion of mineral substances at high temperature. This is especially seen by examining the condition of quartz in granite; it is always found in the crystalline condition, and has invariably a specific gravity of 2.6. There is not a single instance known to the contrary. Hence there is reason to believe that the quartz could never have been fused; for the moment silica is fused, no matter in what condition it was previously, a peculiar glass-like, colloidal mass is produced, having a specific gravity which never exceeds 2.3. *Therefore there is good reason to conclude that granite could never have been formed under the conditions of a high temperature.*"

It only remained now to show how granite was formed, in the wet way, from the sedimentary rocks; and this demonstration has been given, and the granite actually manufactured accordingly. T. Sterry Hunt, F. R. S., of

* *Annual of Scientific Discovery*, 1861, p. 279.—1865, p. 301.

the Canada Geological Commission, in a paper on *The Theory of the Transformation of the Sedimentary Deposits into Crystalline Rocks*, thus explains the matter: "We can not admit that the alteration of the sedimentary rocks has been effected by a great elevation of temperature, approaching, as many have imagined, to igneous fusion; for we find unoxidized carbon in the form of graphite both in beds of crystalline limestone and in beds of iron ore; and it is well known that these substances, and even the vapor of water, oxidize graphite at a red heat, with formation of carbonic acid and carbonic oxide. I have, however, shown that solutions of alkaline carbonates, in presence of silica and earthy carbonates, slowly give rise to silicates with disengagement of carbonic acid, even at a temperature of 212°; the alkali being converted into a silicate, which is then decomposed by the earthy carbonate regenerating the alkaline salt, which serves as an intermedium between the silica and the earthy base. I have thus endeavored to explain the production of the various silicates of lime, magnesia, and oxide of iron, so abundant in crystalline rocks; and with the intervention of the argillaceous element, the formation of chlorite, epidote, and garnet. I called attention to the constant presence of small portions of alkalies in insoluble combination in these silicates—a fact which had already led Kuhlmann to conclude that alkaline silicates have played an important part in the formation of many minerals; and I suggested that, by combining with alkalies, clays might yield feldspars and micas (the chief ingredients of granite), which are commonly associated in nature with the silicates above mentioned. This suggestion has been verified by Daubree, who has succeeded in producing feldspars by heating together for some weeks, to 400° C., mixtures of kaolin and alkaline silicates in the presence of water. The problem of the generation from the sands,

clays and earthy carbonates of the sedimentary deposits, of the various silicious minerals which make up the crystalline rocks, may now be regarded as solved; and we find the agent of the process in waters holding in solution carbonates and silicates acting upon the heated strata."* In a word,

GRANITE IS A MORTAR, NOT A METAL.

To this conclusion the most advanced geologists of Europe have been slowly, but irresistibly, impelled; and such men as M. Rose, Poulett Scrope, Scheerer, Sorby, Elie de Beaumont, Lyell, and Ansted have given their testimony against the fallacy of the igneous theory. Space permits only one or two testimonies out of a number before me.

Sir Charles Lyell, in his speech on taking the chair of the British Association, as president for 1864, asserts, *ex cathedra:* "Various experiments have led to the conclusion that the minerals which enter most largely into the composition of the metamorphic rocks have not been formed by crystallizing from a state of fusion, or in the dry way. but that they have been derived from liquid solutions, or in the wet way—a process requiring a far less intense degree of heat. . . . . The study, of late years, of the constituent parts of granite, has, in like measure, led to the conclusion *that their consolidation has taken place at temperatures far below those formerly supposed to be indispensable.* Gustav Rose has pointed out that the quartz of granite has the specific gravity of 2.6, which characterizes silica when it is precipitated from a liquid solvent, and not that inferior density, namely, 2.3, which belongs to it when it cools and solidifies in the dry way from a state of fusion."

Prof. Ansted asserts, in a paper read before the British

* *Journal of the Geological Society.* London, 1859.

Association of 1867, on *The Conversion of Stratified Rock into Granite:* "Geologists until recently have spoken of granite as a primitive rock, as the nucleus of the earth, and as having been from time to time erupted, playing an important part in the general disturbances by which the framework of the earth is supposed to have been constructed. The observations of Daubree and Sorby show that all true granite had been elaborated with water, under great pressure, at a temperature below melting heat; that it had neither been ejected nor had it formed a framework. There are granites of all ages and of many kinds. Numerous observations show that granite alternates with, and passes into, stratified rocks, and must itself in such cases be stratified rock; and that its production does not necessarily involve the destruction and obliteration of all the stratified rocks with which it is associated. This view of the nature of granite will greatly affect the theories of geology."

Hitchcock formally demonstrates the metamorphism of the stratified rocks into granite. "There is reason to suppose that a large part of the granitic rocks of New England are merely transformed slates, schists, and conglomerates. Granite seems to be the most complete form of metamorphosis." *

This exactly reverses the theory of the evolutionists, of the formation of the present strata as the result of the processes of a cooling globe. So far as the so-called igneous rocks are concerned, they have been formed by the very contrary process, of heating up, and baking of the sedimentary rocks. The granite itself is only a well-baked fire-brick, made originally of mud; and the whole theory of the molten interior of our globe is demonstrated to be a fable, impossible and absurd.

That this discovery will greatly affect theories of

* *Geology*, p. 224.

geology is certain; and not less so that it will completely overthrow the whole scheme of anti-Bible geology, with all the assailants of Moses for his silence about the cooling of our fused globe, and all the rest of the theory. Ministers, Sabbath-school teachers, and common-school teachers, should familiarize themselves with the subject; so that when they find the minds of their people or of their pupils in danger of being perverted, they may be competent to expose the blunder of the infidel geologist. The facts of the case are patent and undeniable.

Since this subject has been discussed in the religious periodicals, attempts have been made to brow-beat them into silence by the allegation that they are mere tyros in geology. But it does not require a very profound knowledge of science to see a palpable blunder. A man need not be a profound mathematician to know whether or not one and one make three. And surely one need not read a great many volumes, nor hammer all the rocks in the Alleghanies and the Sierra Nevadas, to be able to tell the difference between a brick-yard and an iron furnace, or between a man who mistakes the one for the other, and a man of science. No! Gentlemen, we will take the liberty of doubting your infallibility so long as you go on blundering at that rate.

But it has been alleged in extenuation, that the mistake is not fundamental to the science of geology. No mistake is fundamental to any *true* science. But this mistake is fundamental to the theory of evolution, which has arrogated to itself the title of the science of geology. The citations already given abundantly prove the assumption of the name of geology for such cosmogony; and scores of such citations can be given from popular writers, and from geological lectures delivered in every country town. The attempt to show that it is not important because some geological writers devote to its discussion only a few

pages in the beginning of their books, is quite sophistical. The importance of a statement does not depend on the number of pages it covers. The Declaration of Independence covers only a couple of pages of American history. Is it therefore not a fundamental fact? Moses' account of the creation occupies only a single page, but all the rest of the Bible stands or falls with its truthfulness. Our infidels feel this, and labor with all their might to overturn that introductory chapter. And we have now overthrown their first chapter of Genesis, and demonstrated its falsehood and absurdity. The whole edifice of evolution falls into the mud which has swallowed up its granite foundation.

Neither will it be possible to evade the difficulty, and to retain the rest of the infidel system, after its foundation is overturned, by alleging the difference between a material and a logical foundation. This is both a material and a logical foundation. The logic is founded upon the alleged fact. The alleged fact is proved to be a fable. The logic based upon the fable must be fabulous also. The most legitimate reasoning from a false fact produces only a logical lie. I cannot believe either the theory or its proposer. If an architect begins to show me his skill in house-building by describing to me the process of building a brick house as commencing at the iron furnace, carried on by pouring out the molten iron into castings, and then screwing them together, while all the time I see that the house is made of brick and mortar, and not of cast-iron at all, would you say, "Oh, that was only a material, not a logical mistake; Mr. Fireman is, after all, a very good architect." We really must press this point of want of confidence in our geological blunderers. When we are obliged to remove the material foundation of facts on which they have built their theory, we would rather be excused from having their theory, or any theory,

pressed upon us as science upon their authority. When we find a gentleman mistaking a mud-scow for a steamboat, we would rather not take passage on either vessel under his command just then. Until geological evolutionists settle down into some degree of sobriety, we must be excused from troubling ourselves about their speculations as to the origin of the earth.

6. *Any Theory of Geological Evolution Framed in Ignorance of the Earth's Interior, Insults our Common Sense.*

Ignorance, the most profound, of the materials of the nine hundred and ninety-nine thousandth parts of our globe, must ever constitute the prime qualification of evolutionists for describing its formation. Ignorance, if possible still more profound, of the conditions of temperature, pressure, electricity, and magnetism, prevailing in the interior of the earth, must give the laws by which our theorists pretend to regulate its evolution at the present time. Much more dense must be their ignorance of such conditions millions of ages ago. Therefore we exorcise all such theories, as the angels of darkness.

It seems to be taken for granted that Christians must adopt some one or other of the cosmogonies which scientific men are so constantly manufacturing. If we do not accept Darwin's development theory, then we are supposed to patronize Agassiz' notion of the plurality of races of mankind, and so forth. We distinctly decline either of these notions. If we prove one of them to be absurd, it by no means follows from that exposure that the other is a whit more rational. Of two contradictory theories, it is positively certain that one is erroneous; but if two contradictory theories are respectively supported by able men, it is highly probable that *both* are erroneous; since the contradictions declare their apparent errors, and apparent errors are always likely enough to prove real errors.

Our position is, *that not only this evolution cosmogony, but all human cosmogonies, are necessarily absurd.* Common sense will quietly ignore them all. There never was a scientific description of the process of the creation of the world which was not ridiculous; and there never will be any such description which will not be ridiculed by the youths of the next generation. No *science* of any such process is possible to man; and no speculation on the subject deserves any respect.

The evolutionists are profoundly ignorant of the very foundation facts of their geological system. They cannot tell the materials of the earth. The all-important question arises, What is the dense and rigid material, more dense than cast-iron, and more rigid than steel, which constitutes the nine hundred and ninety-nine thousandths of our globe, compared with which our geological strata are but as the thickness of the skin to the onion; and whose chemical, electrical, magnetic, and mechanical movements are hourly affecting our surface geology? Without an answer to this question any theory of world-building is merely a burlesque. Indeed, the professor of the white-wash-brush is much better qualified to set up for architect for the Capitol, than the geologist acquainted only with surface strata to frame a theory of world-building. The Hindoo earth rests on the elephant's back; the elephant stands on the tortoise's back; what does the tortoise stand on? The tertiary rocks rest on the secondary; the secondary on the primary; what do the primary rest on? To this geologists respond in learned phrase as follows: "Laying aside all hypothesis, our knowledge of the constitution of the earth's crust may be summarily stated. 1. The density of the rocky crust is on an average two and a half times that of water. 2. The mean density of the whole mass is five times that of water. 3. The central part can not be composed of similar materials

with the crust, otherwise the compression toward the centre would become so great that the mean density of the earth would be greater than it is. 4. That the condensation of the central mass must be counterbalanced by some expansive influence such as heat, *or have a constitution unlike any substance with which we are acquainted.*" * Which, being translated into the vulgar tongue, means, that they do not know, and cannot even guess, what it is. And yet these are the "geological grounds" in which the Colenso class "know for certain" the errors of the Bible. Ignorance and mutual contradictions make up their science.

Let an attempt be made seriously to consider what a scheme of evolution of the world implies. What are the indispensable qualifications of the philosopher who frames an account of the formation even of our own little solar system? What are the facts which he must know, not guess at, but *know*, in order that he may account for them? What are the powers engaged in developing the world with all its tenants into its present state? What measure of familiar acquaintance and experimental trial has he made of their capacities and energies and modes of operation?

WHAT MUST A WORLD-BUILDER KNOW?

The facts which he must know are such as these:—the number, the positions, the mechanical arrangement, and the chemical constituents of all the bodies constituting the vast machine of which our system is a part, *i.e.*, of all the stars of heaven. Moreover he must know the nature and succession of all the minerals, vegetables, and animals which ever existed in these worlds. If our evolutionist does not know the beings which are made, how can he tell the process of making them? But does any

* Chambers's *Geology*, p. 13.

man pretend that he has seen, much less examined, all the heavenly bodies? Does any man pretend acquaintance with the geology, botany, or zoölogy of even the planets of our solar system? Does any geologist pretend to know what constitutes the substance of our own earth? Does he pretend to know one body out of the millions whose formation he describes? How, then, can he describe their development or even say that they were developed?

Then as to the forces which act on all these bodies, what does he know about them? Gravity was, till lately, supposed to be the only force, and La Place's cosmogony was constructed accordingly. Next voltaic electricity was discovered, acting on all rocks. Then heat was applied as a cosmical agent. Next came the discovery that light operates powerfully, not only on plants and animals, but on metals and rocks. Recently it has been discovered that magnetism is not only a terrestrial, but a cosmical agent, and that the sun's magnetic condition affects our earth most sensibly. How many other forces, acting on all parts of the universe, exist utterly unknown to our cosmogonists, it is impossible to say; but, judging from these recent discoveries, there must be many. Supposing, however, all the forces of nature have now been discovered, what do our evolutionists know about them? What use have they made of them in their theories? What reason have we to believe that the use they have made of them is scientific and rational? The mere asking of such questions is, to any man acquainted with the process of scientific discovery during the past century, the most convincing exposure of the presumption and gross incapacity of the framers of these cosmogonies. Why, it is only the other day that cosmical magnetism and the correlation of forces were discovered; yet men were making cosmogonies for us who were ignorant of these fundamental facts. As world-builders, these men are in

a worse plight than the old saw-mill builder who called himself a civil engineer, and who, to save paying a watch-maker, cleaned his clock himself; but found when he had got it thoroughly reconstructed, that he had three or four wheels left over—enough to start a new clock! So they have finished their universe according to their highest ideas, and in the latest scientific fashion, and behold, there are left forces and materials of which they know nothing, sufficient to make another!

The insolence of these evolutionists in thrusting their vagaries upon mankind as *science*, demands rebuke. They proceed with the manufacture and publication of such theories in apparent unconsciousness that they are insulting the common sense of mankind. Since no more gentle intimations avail, we must tell them plainly that we will not longer endure their misbehavior. When a Jew peddler offers to sell a pinchbeck watch for gold to a gentleman in the city, he naturally feels indignant that the fellow should mistake him for a clown, and has him arrested by the nearest policeman, as a swindler. But the scientific swindler is even more insulting; for the peddler's pinchbeck is made at least to look like the genuine article, but the theory of evolution looks like nothing in heaven, or on earth, or under the earth. Must our respect for science prevent us from kicking the swindler out of doors? Respect for science indeed! Why, that is the very stink of the insult—that the fellow should try to pass his preposterous notions upon us for *science;* evidently supposing that we do not know the difference between science and speculation; or, perhaps, that we do not understand the scientific terms with which he gilds his notions. Every man who has any respect for genuine inductive science should feel himself in duty bound to thrash all such dreaming speculations out of its halls, and to warn the public against them as scientific swindles.

If it were at all likely that the manufacturers of these great scientific swindles would pay any attention to religious considerations, it would be proper to show them the impiety, as well as the insolence of their misconduct. Almighty God challenges creation as his peculiar prerogative, and asserts the capacity of comprehending it as far beyond man's feeble powers. "Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding? . . . . Whereupon are the foundations thereof fastened? or who laid the corner-stone thereof; When the morning stars sang together, and all the sons of God shouted for joy?" But these world-makers stand ready to answer all the questions with which He designed to humble the pride of man's vain boasting. It is not enough for them to endeavor humbly after the discovery of God's plan of working, that they may give him the glory of it; they have eaten of the tree of knowledge, and are become as gods, and are now competent to correct God's revelation by this new scientific revelation of their own. We have already cited blasphemous language regarding the glory of the God of heaven; but the language of all their attempts is:—"I am competent to understand the universe. The limitations of human knowledge do not apply to me." The progress of such a boastful confidence in man's powers of intellect as leads one either to construct or to believe one of these speculations, is always towards atheism. The fundamental idea is to ignore Almighty God—to construct a science which will not need him.

So far as geology deserves the name of science—so far as it furnishes and classifies facts—it will furnish testimonies of a Power superior to nature, and of the existence of orderly arrangement, evident adaptation of beings to their place, and of the permanence of one design running through all its provinces. To this permanence of design

the naturalist gives the name of "law;" and from the existence of law, reason infers the existence of a Law-giver, to devise the plan, to bestow the force, to guide the regularity of observed processes. An atheistic geology therefore is, from the nature of the case, impossible; the very classification of the facts proving the existence of a creating, scientific, classifying mind, prior to the existence of the observed, scientific, classified facts. M. Agassiz justly observes that true classification is the discovery and expression of the Creator's plan. But, inasmuch as science deals only with the things created, it can know nothing of beginnings. Like other infants, it can not describe its own birth, and so can not produce a cosmogony. A scientific cosmogony is a contradiction in terms.

The Bible gives no cosmogony, no description of the evolution of a cooling globe. It simply says, "In the beginning God created the heaven and the earth;" and then goes on to tell of the deposition of the sedimentary strata, and the successive introduction of plants and animals. For this, among other reasons, the proposed reconciliations of Genesis and geology were all, and always, unnecessary. There could be no conflict between them. They belong to different spheres. The geologist can not describe the process of creation, and Moses does not. It may well be asked, indeed, is there any process from nothing to something? Creation must be instantaneous. Moses, accordingly, merely tells us, "In the beginning God created the heaven and the earth;" then that an indefinite period of sedimentary formations succeeded; and that a few thousand years ago God prepared a part of the earth's surface for the occupation of the existing human race. It is no part of the design of the Bible to teach geology, or any other science which man can learn from God's works; yet no man has ever succeeded in proving that any statement of this ancient

volume contradicts any *fact* of modern science. When we consider the ideas of the most learned men of surrounding nations of that period concerning the origin of the world, and peruse the fables they have written, we perceive a wondrous contrast with the Bible narrative. Compare, for example, the Chinese story of Pwangku chiseling out the granite heavens, or the Hindoo cosmogony of the sacred egg, and of the emergence of the sacred mount, and the seven seas of milk, melted butter, honey, rum, etc., from an inundation which drowned all the heavens up to the pole-star, with the sobriety and dignity of the Bible, and ask, Whence this astonishing contrast? Contrast the reticence of Moses with the garrulity of our modern savans when they enter upon cosmogony. World-making is one of the strongest passions of the human intellect. How comes it to pass that Moses resists the temptation by which our most sober inductive philosophers have been seduced, to describe the processes of creation, the condensing nebulæ, the igneous nucleus, etc.? The writers who could describe light as "the undulation," "the flowing," who knew that it existed before the sun, who could describe man's intellectual supremacy, and yet assert his recent arrival on earth, who could describe the sky as the expansion, and hang "the earth upon nothing,"* could surely have speculated upon the development theory.

WHY, THEN, DID NOT MOSES MAKE A FOOL OF HIMSELF

like the Chinese, Hindoos, and evolutionists, by giving us an impossible cosmogony? There is only one power which can restrain the insane pride of the human intellect from intoxicating itself with the forbidden fruit of the tree of knowledge, and becoming as gods, and driveling forth its drunken projects of creation. That power

*Job xxvi. 7.

restrained Moses from astronomical and geological cosmogonies. And when we remember the theological cosmogonies—Hebrew, Patristic, Monkish, Protestant, and Pantheistic—which have been spun professedly out of the allusions of the Bible, so much more absurd than those of the heathen, and so much more mischievous as claiming divine authority, we see that nothing less than divine restraint prevented Moses from giving the world a circumstantial geological cosmogony to be the laughing-stock of future discoverers.

True science, in view of such developments, will maintain a respectful attitude to Scripture. It will fearlessly prosecute its researches into the works of God, and calmly and clearly tell its discoveries. It will not intrude into the domains of revelation, with whose objects, methods and phenomena it professes to have no acquaintance. It will be especially shy of meddling with subjects beyond its own domain, of the visible and tangible, and will feel insulted when men parade their day-dreams of world-building as her discoveries. And, considering how the credulity of Christendom has been of late years abused by all sorts of pretended scientific discoveries, the true philosopher will acknowledge the reasonableness of a little popular incredulity regarding scientific novelties, and more especially if they come heralded as fatal to faith in the Bible; for we have had now eighteen centuries' experience of the truth of Jesus Christ, and it is too much to expect equal confidence in any mushroom philosophical theory.

The interpreter of God's word will feel equally friendly toward the interpreter of God's works. He well knows there can be no antagonism between them; and when the cry of the discovery of some great anti-Biblical fact is raised, he will not feel at all disturbed. He has heard this alarm often before, but the Bible yet stands. God's

anvil has worn out many a hammer. He will not deny any authentic fact of science because it does not tally with his preconceived notions of Scripture. As the prophetic Scriptures are best interpreted by the fulfillment, so the scientific scriptures are best interpreted by the discovery. For though creation and revelation are both infallible prophets, yet our interpretations both of science and of Scripture are quite likely to prove fallible and erroneous. The remembrance of the blunders of theologians in attempting to construct science out of Scripture, and of the blunders of geologists in extracting a cosmogony out of science, ought to teach both the humility proper to ignorance.

ANTI-CHRISTIAN GEOLOGIES.

As to the anti-Christian theories of geology, past, present, or future, we presume most of our readers are quite satisfied to dismiss them to the care of those who have nothing better to occupy their attention. Their history (as we have seen) up to the beginning of this century, is a succession of wild imaginations and baseless fictions, each eagerly believed for a time, and speedily dismissed for a more attractive successor. And we have also presented the latest discoveries, not of second-hand geologists, but those of the foremost actual investigators of nature, and their experiments upon the constitution and mode of formation of the lowest rocks accessible to man, experiments which utterly demolish the current geological cosmogony of evolution, leaving the whole system in utter chaos. There is no foundation left; no knowledge of materials out of which to rebuild the globe; no known processes of construction; no elements of chronology; no sufficient force in nature for peopling or forming the world. The materials accessible for the construction of a new theory consist of an imperfect knowledge of about

one ten-thousandth part of the earth's crust, and a profound ignorance of the nature and energy of the materials and forces by which the vast mass beneath continually operates upon this little portion of the surface. Yet upon this slender basis, we may rest assured, new anti-Biblical theories will speedily be erected. Doubtless, each of these geologies in its turn will be demolished by its successor; but that will not deter mankind from making and loving and believing another lie. In the three-score years and ten of a busy life, men who have bread to earn, and families to keep, and souls to save, can not give personal attention to geology, nor solve for themselves the great problems of the universe; if they believe anything on such subjects they must take somebody's word for it, and it is a matter of choice whether a man shall believe Lyell or Moses, Christ or Tyndall. The choice will be determined by the man's disposition; if he dislikes Bible religion he will not believe its prophets; he will receive in preference the allegations of men who, without pretending to revelation from any one who has seen it, describe the interior of the earth. But one would suppose that even the credulity of infidelity would be nauseated with endless impositions; and that common sense would suggest, "As all these geological refutations of the Bible are false, what if its account of God and the world be true?"

This Bible is one of the powers in the moral world. It has existed over thirty centuries, and has revolutionized our own and many other nations, rendering the pursuit of geology, and of science, possible among the descendants of savages. It reveals to us the great fact of the subserviency of physical to moral law; declaring that the last diluvial epoch which swept the habitable earth was coincident with the grossest moral corruption of mankind. It predicts another vast geological revolution, in which the life of earth shall make another grand advance,

greater even than that at the dawn of the human period; a revolution "in which the heavens being on fire shall be dissolved, and the elements shall melt with fervent heat; the earth also and the works that are therein shall be burned up." It declares that the Judge shall descend at that day, and reward every man according to his works. There will remain no place for criticising spectators. All who are not supernaturally preserved shall meet the just punishment of their sins. Reader, are you prepared with a refuge for that day of judgment and perdition of ungodly men? Oh! make the Creator of the globe your friend! He makes you this proposal, that you shall confess and forsake your sins, and own Him as your Saviour and Lord, and he will cover you with his strength when the mountains are cast into the sea. "The mountains shall depart and the hills be removed, but my kindness shall not depart from thee, neither shall the covenant of my peace be removed, saith the Lord that hath mercy on thee." "We, according to his promise, look for new heavens and a new earth wherein dwelleth righteousness." "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."

"It follows that our record must be in the highest degree imperfect; and we have hardly a trace left of thick deposits, or any definite knowledge of the area they have occupied in a great many cases. And, mark this: That supposing even that the whole surface of the earth had been accessible to the geologist—that man had had access to every part of the earth, and had made sections of the whole and put them all together—even then his record must of necessity have been imperfect.

"But to how much has man really access? . . . Three fifths of the surface of the earth is shut out from us because it is under the sea. Let us look at the other two fifths, and see what are the countries in which anything that may be termed searching geological inquiry has been carried out. . . . Of the whole great mass of Africa, except parts of the southern extremity, we know next to nothing; little bits of India, but of the greater part of the Asiatic continent nothing; bits of the North American States and of Canada, but of the greater part of the continent of North America, and in still larger proportion of South America, nothing!

"Under these circumstances, it follows that, even with reference to that kind of imperfect information which we can possess, it is only about the ten-thousandth part of the accessible parts of the earth that has been examined properly. Therefore it is with justice that the most thoughtful of those who are concerned in these inquiries insist continually upon the imperfection of the geological record. For, I repeat, it is absolutely necessary, from the nature of things, that this record should be of the most fragmentary and imperfect character. Unfortunately, this circumstance has been constantly forgotten. Men of science, like young colts in a fresh pasture, are apt to be exhilarated on being turned into a new field of inquiry, to go off at a hand-gallop, in total disregard of hedges and ditches, to lose sight of the real limitation of these inquiries, and to forget the extreme imperfection of what is really known. Geologists have imagined that they could tell us what was going on at all parts of the earth's surface during a given epoch; they have talked of this deposit being contemporaneous with that deposit, until, from our little local histories of the changes at limited spots of the earth's surface, they have constructed a universal history of the globe as full of wonders and portents as any other story of antiquity."—*Prof. Huxley, Lectures to Working Men.*

ON THE ORIGIN OF LIFE.

THE ERRORS OF EVOLUTION.

ON THE ORIGIN OF LIFE.

I. WAS MAN EVOLVED FROM GRANITE?

The errors and absurdities of evolutionists in attempting to account for the origin and structure of the heavens and of the earth without acknowledging an intelligent and almighty Creator, are obvious. And it is also clear that even with such a recognition of a Creator, neither God nor man could ever make a world, or anything else but nonsense, out of the Nebular Hypothesis of skeptical scientists.

We now come to examine the farther development of the hypothesis of atheistic philosophers, in the notion of the evolution of animal and vegetable life from the mechanical forces contained in the granite globe of nebular origin. We say *mechanical forces*, since all the chemical, electrical, and vital forces of nature are, by evolutionists, reduced to modes of motion, ultimately of the atoms, or, in the last analysis, of the molecules of matter. All existing plants, animals, and men, with all their activities, achievements, life, and reason, were originated from the original matter of the world by its own free and uncaused movements. Evolution is the antithesis of creation.

Professor Tyndall, fearing apparently lest the atheism of the theory should be so hidden in its absurdity as to pass unnoticed, makes an explicit comparison and contrast between evolution in its grossest naked materialism, and the creation of man as recorded in the Bible. This is

TYNDALL'S STATEMENT OF THE QUESTION:

"The gist of our present inquiry regarding the introduction of life is this: Does it belong to what we call matter? or was it inserted into matter at some suitable epoch—say, when the physical conditions became such as to permit the development of life?" "There are the strongest grounds for believing that, during a certain period of its history, the earth was not, nor was it fit to be, the theatre of life. Whether this was in a nebulous period, or merely a molten period, does not much matter; and if we resort to the nebulous condition, it is because the probabilities are really on its side. Our question is this: Did creative energy pause until the nebular matter had condensed? until the earth had been detached? until the solar fire had been so far withdrawn from the earth's vicinity as to permit a crust to gather round the planet? Did it wait until the air was isolated? until the seas were formed? until evaporation, condensation, and the descent of rain had begun? until the sun's rays had become so tempered by distance and by waste, as to be chemically fit for the decompositions necessary to vegetable life? Having waited through those æons until the proper conditions had set in, did it send the fiat forth, 'Let life be'? These questions define a hypothesis not without its difficulties, but the dignity of which was demonstrated by the nobleness of the men it sustained. However the convictions of individuals here and there may be influenced, the process must be slow which commends the process of natural evolution to the public mind. For what are the

core and essence of this hypothesis? Strip it naked and you stand face to face with the notion, that not alone the mere ignoble forms of animalcular or animal life, not alone the nobler forms of the horse and lion, not alone the exquisite wonderful mechanism of the human body, but that the human mind itself—emotion, intellect, will, and all their phenomena—were once latent in a fiery cloud. Surely the mere statement is more than a refutation." "I do not think that any holder of the evolution hypothesis would say that I have misstated it in any way; I have merely stripped it of all vagueness, and bring before you, unclothed and unvarnished, the notions by which it must stand or fall. Surely these notions represent an absurdity too monstrous to be entertained by any sane mind."* Nevertheless, he goes on to argue for the absurdity, and to trace the primeval *moneron* to the molecular action of primeval matter, as we shall farther see.

It is supposed that this astonishing statement will be rendered less startling by saying that this self-creation of life happened a very long time ago, and that the first living creatures which produced themselves, or were produced by the motion of the little molecules, were very small, and very simple in their organization. It is also expressly argued that there was no design, either on their part or on the part of anybody, to make living things; but that the origin of life was simply a lucky accident, arising out of the infinite jostlings of atoms and molecules in infinite ages. Some little particles of oxygen, carbon, hydrogen, and nitrogen happened to meet and unite, and suddenly found themselves converted into protoplasm, and endowed with sensation; felt hungry, and began to look for something to eat, and grabbed at the first likely mouthful, and started out to look for more,

* From a paper read before the British Association, cited in *Christianity and Positivism*, p. 31.

and found it, and ate it, and grew and multiplied. From

THIS LITTLE FOREFATHER OF THE HUMAN RACE,

all the rest of us have since descended or ascended—as we may choose either to honor our parents, or to imagine ourselves a great improvement on our ancestors. But considering the small capital this little fellow had, only the size of a pin-head of protoplasm, to begin the world with, and that in the most literal sense he was a "self-made" man, there being no one in the world to give him a helping hand, Mr. Darwin, perhaps, was right in speaking of "the *descent* of man." That primeval *moneron* who first started life on our earth out of lifeless clay, was a far smarter fellow than any of his sons. Neither Darwin, nor Huxley, nor Tyndall, nor Bastian, nor Haeckel, nor the whole race of men combined, has ever been able to do the like since, notwithstanding all our chemistry, and electricity, and steam-engines. That primeval dot of albumen, without tools, without education (he never was even a single term at school in his life), without even an audience to applaud him, introduced into existence the millions of mankind with all their glory, from the Pyramids of Egypt to the Electric Telegraph, and from the Law of Moses to the latest Illustrations of Human Progress, including Rule Britannia, Hail Columbia, and all other "modern improvements."

One is in danger of getting excited over the achievements of an honored ancestor, and of forgetting that in this republican world every man must struggle for existence for himself, sometimes with but indifferent luck, as Darwin tells us. Therefore it is better just here, in the beginning of the business, to moderate our enthusiasm and restrain our plaudits. Let us then take a calm, scientific, business view of our origin. Let us listen to our gene-

alogists as they rehearse our pedigree. And it is better to quote their own words, lest I should unintentionally misrepresent their meaning if I endeavored to "translate them into the vulgar tongue to be understanded of the people."

The prophets of evolution are more numerous than those of Jezebel; but we shall content ourselves with a few representative savans,—Tyndall and Huxley and Darwin and Herbert Spencer in England, and Haeckel and Büchner in Germany, will be acknowledged as the leading evolutionists.

In order to give their little self-creating pin-head of protoplasm a clear field for his energies, most of them begin by clearing Almighty God out of the world. Mr. Darwin, however, must be excepted from this attempt. He expressly recognizes the Creator's agency in the creation of five or six primeval forms. But the others see no need for a Creator. Thus Haeckel says: "But a truly natural and consistent view of organisms can assume no supernatural act of creation for even those simplest original forms; but only a coming into existence by spontaneous generation." "The fundamental idea which must necessarily lie at the bottom of all natural theories of development is, that of a gradual development of all (even the most perfect) organisms, out of a single, or out of a very few, quite simple and quite imperfect original beings, which came into existence, not by supernatural creation, but by spontaneous generation, or archigony, out of inorganic matter."*

We have seen under what unfavorable circumstances life was compelled to originate, and need not wonder that it was content with a small beginning. Let our evolutionists themselves describe the poverty of their ancestors: "Of still greater, nay, the very greatest, importance to the theory of spontaneous generation, are, finally, the

* *History of Creation*, pp. 48, 75.

exceedingly remarkable *monera*, those creatures which we have already so frequently mentioned, and which are not only the simplest of all observed organisms, but even the simplest of all imaginable organisms. . . . . Through the discovery of these organisms, which are of the utmost importance, the supposition of spontaneous generation loses most of its difficulties. For as all trace of organization—all distinction of heterogeneous parts—is still wanting in them, and as all the vital phenomena are performed by one and the same homogeneous and formless matter, we can easily imagine their origin by spontaneous generation. . . . . The whole body of these most simple of all organisms, a semi-fluid, simple and formless lump of albumen, consists in fact of only a single chemical combination. . . . . Only such homogeneous organisms as are yet not differentiated, and are similar to the inorganic crystals in being homogeneously composed of one single substance, could arise by spontaneous generation, and could become the primeval parents of all other organisms."*

We only stop here to notice that Dr. Huxley proves that the protoplasm of every living being is by no means the simple homogeneous affair Haeckel describes above. But even the pin-head of protoplasm is a small enough beginning of life, when we consider the wonderful advances it has made in bulk and intellect, and what a millionaire it has multiplied itself into, counting all the innumerable insects, fishes, birds, beasts, and men as its children. The most advanced evolutionists allege that there was only one progenitor, and charge Mr. Darwin with inconsistency for admitting five or six gray forefathers of the human and other races.

It is quite wonderful to listen to the recital of the achievements of this little fellow, who had to begin life on so small a capital. But Professor Huxley has found

* Haeckel's *History of Creation*, I. 185, 186, 187, 330, etc.

in the sting of a nettle, little cells of protoplasm compared with which Haeckel's *monera* are mammoths; and these small but lively specimens, he gravely informs us, are not only able to work themselves up into men and women, but actually to lead mankind down to what they think the antipodes of the top of Jacob's ladder. Hear him (*Lay Sermon*, 138): "But I bid you beware that in accepting these conclusions, you are placing your feet upon the first round of a ladder which, in most people's estimation, is the reverse of Jacob's, and leads to the antipodes of heaven. It may seem a small thing to admit that the dull vital actions of a fungus, or a foraminifer, are the properties of their protoplasm, and are the direct results of the nature of the matter of which they are composed. But if, as I have endeavored to prove to you, their protoplasm is essentially identical with, and most readily converted into, that of any animal, I can discern no logical halting-place between the admission that such is the case, and the further concession that all vital action may, with equal propriety, be said to be the result of the molecular forces of the protoplasm which displays it. And if so, it must be true in the same sense, and to the same extent, that the thoughts to which I am now giving utterance, and your thoughts regarding them, are the expression of molecular changes in the matter of life which is the source of our other vital phenomena."

An evolutionist can hardly imagine a grosser materialism than this. Huxley's *Lay Sermons*, with all their eloquent defense of error, scientifically viewed, are only so many ounces of protoplasm. So, instead of school-boys saying of a rather crude and illogical essay, "it is all *bosh*," henceforth, in deference to Prof. Huxley, the boys will say, "*It's all protoplasm.*" The difficulty is in finding out how the sophistry got into the bosh—or into the protoplasm.

Büchner is equally explicit in denying to God any hand in creating or governing the world. "That the world is not *governed*, as frequently expressed, but that the changes and motions of matter obey a necessity inherent in it, which admits of no exception, cannot be denied by any person who is but superficially acquainted with the physical sciences. . . . . Matter is the origin of all that exists. All natural and mental forces are inherent in it. . . . . What this or that man may understand by a governing reason, an absolute power, a universal soul, a personal God, etc., is his own affair. The theologians, with their articles of faith, must be left to themselves."*

II. SCIENTIFIC OBJECTIONS TO EVOLUTION.

This theory of evolution is based upon the grossest materialism, and the most blatant atheism. However, we are not now examining its philosophy, or its theology, but its claims to be a scientific account of the origin of life in the earth. And we object to it scientifically, because:

1. It is an Antiquated Heathen Superstition.
2. It is Contrary to All Observation and Experience.
3. It is Unscientific, Self-contradictory, and Absurd.

1. *The Theory of Evolution of Animals from the Earth and Sea by their Own Powers, is an Antiquated Heathen Superstition.*

It must be owned that a credulity far beyond the capacity for belief in Almighty God is demanded from the votaries of this scientific superstition. At first view it might seem probable that it would revolt the common sense of mankind by its absurdity. But transcendental superstition is the idol of speculative minds, especially if

* *Matter and Force*, 5, 12, 43.

it promises to reveal the mysteries of creation; and accordingly it was the atmosphere of all the ancient heathen mysteries. The vulgar adored it for its incomprehensibility. In seeking to solve the mystery of the union of mind with matter, it starts with an assumption highly flattering to human pride—the assumption, that man is able to understand and explain the plan of universal being; that the finite creature is able to comprehend the infinite Creator in his most exclusively divine work—the creation of the human soul; or, if the Creator is denied, then the method of the self-evolution of man, body and soul, from the earth.

The modes of the solution of the problem vary, but they are all based on Unisubstancisme—the belief that mind and matter are one substance. In the Popish transubstantiation, matter—the bread—is converted into the soul and divinity, as well as into the flesh of Christ; and the body of the Lord is converted into the life eternal of the worshiper. This involves the doctrine of the ultimate identity of matter and spirit. The Hindoo Brahminical metempsychosis denies any objective reality to matter, and asserts that the Great All is spirit. The Burmese and Chinese Buddhists, and the Development Dogmatists of Europe and America, assert the eternity of matter, and derive spirit from it, as one of its powers. This doctrine of Unisubstancisme, accepted as it has been by the most ancient and populous nations, and held to-day by a large majority of the human race, deserves a closer examination than it has received from modern metaphysicians. It attracts mankind by its combination of mystery and simplicity.

We direct our attention, however, rather to the physics than to the metaphysics of the theory, since its professors emphasize the material as not only first in order, as the Bible also says, but chief in dignity. And to begin at

the beginning, as they also claim to do, we follow the counsel of Mr. Herbert Spencer, formerly cited, and trace

THE PEDIGREE OF THE THEORY OF EVOLUTION.

We shall indeed find that its family is a very old family, and, moreover, a very large one; but we can scarcely add the customary commendation of "respectable," scientifically speaking. The reader must judge for himself of the scientific and philosophical value of the Chinese cosmogony, and of the scientific infallibility of the decrees of the Council of Trent. He may, perhaps, say Prof. Huxley teaches that the theories of Buddhists, and Papists, and evolutionists, are all—protoplasm!

(i.) *The Asiatic Evolutionists* are divided into two classes: the Brahmins, who hold to the development of spirit into what we suppose to be matter; and the Buddhists, who are the teachers of our European and American evolutionists in developing matter into spirit. From them the Egyptian and Greek philosophers seem to have received the idea, and through the latter it passed over into western Europe. It seems to have been an ancient superstition, embodied in a philosophical form by a number of independent thinkers, at various times and in different parts of Asia. Sakyamuni—called also Gautama, and Buddh—about the year B. C. 535, taught it with great success in India; and it was expounded about the same time by several Chinese philosophers. The most complete system is given by one of the commentators of Confucius, Chu Hi (just sneeze, if you would pronounce the name). His system seems very much to resemble that of the modern evolutionists of Germany, anticipating Büchner's doctrine of matter and force. He gives us a cosmogony on the principle of the eternity of matter, and of its powers in action. He says: "Under the whole heaven there is no primary matter (*li*) without

the immaterial principle (*ki*); and no immaterial principle apart from the primary matter. Subsequent to the existence of the immaterial principle is produced primary matter, which is deducible from the axiom, that the one male and the one female principle of nature may be denominated *tau* (or *logos*, the active principle from which all things emanate); thus nature is spontaneously possessed of benevolence and righteousness (which are included in the idea of *tau*).

"Originally, however, no priority or subsequence can be predicated of the immaterial principle and primary matter, and yet if you insist on carrying out the reasoning to the question of their origin, then you must say the immaterial principle has the priority. But it is not a separate and distinct thing, it is just contained in the centre of the primary matter, so that were there no primary matter then this immaterial principle would have no place of attachment. Primary matter consists in fact of the four elements, of wood, water, metal and fire; while the immaterial principle is no other than the four cardinal virtues, of benevolence, righteousness, propriety, and wisdom." *

This seems to be the original of which Büchner's Matter and Force is a free translation. Only the Chinese evolutionist, with the precaution of his race, behaves more wisely than the German, in taking care to put into his primary matter all he intends to evolve out of it. He makes his protoplasm benevolent, just, and full of Chinese propriety; while the German forgets the primary moral education of his molecules. That is probably the reason why they become socialists and communists when they grow up to manhood. But we must not invest this primary immaterial principle with personality. On the contrary, it is a principle capable of mechanical division;

* Williams' *Middle Kingdom*, I. p. 550.

for the sensible, practical Chinese fully admits this logical consequence of the inseparability of mind and matter, and also all the other properties of the matter to which it cleaves—extension, divisibility, gravity, etc. With him, weight of character is a literal avoirdupois estimate; morality may be divided into half-ounces, and he keeps his books of account with heaven accordingly. And, with our western philosophers, he holds the mind as a very subordinate dependent upon the invariable laws of nature, and assigns precisely the same reason as Comte, namely, that mind is not capable of independent action, while matter is always acting and re-acting.

"For the primary matter can concrete and coagulate, act and do, but the immaterial principle has neither will nor wish, plan nor operation; but only where the primary matter is collected and coagulated, then the immaterial principle is in the midst of it. Just as in nature, men and things, grass and trees, birds and beasts, in their propagation invariably require seed, and certainly cannot without seed, from their nothingness, produce anything. All this then is the primary matter, but the immaterial principle is merely a pure, empty, wide-stretched void, without form or footstep, and incapable of action or creation; but the primary matter can ferment, and coagulate, collect, and produce things." *

It should be noted that those shrewd Chinese philosophers here protest against the notion of spontaneous generation. With equal ingenuity they avoid the two other absurdities with which the western evolutionists burden their scheme,—the notion that all development is in the direction of progress toward perfection; and that this progress is by imperceptible advances through an infinite series of small gradations. They saw that both these notions were contrary to facts; and so they made

* Williams's *Middle Kingdom*, I. p. 551.

provision for development *downwards*, as well as upwards, and for progress by *starts and leaps* from one species to another, alike for vegetables, insects, fishes, birds, beasts, and men. The number of these advances of the immaterial principle before it reaches human consciousness is eighty-eight, and an equal number of steps of degradation mark the downward path. A period of 12,000 divine years, each equaling 360 human years, a day for a year, is assigned for the completion of this development, and for the attainment of the ultimate reward of absorption into the divine nature. Plato, and after him the Greek philosophers generally, however, reduced the period to 10,000 years. Spencer and Darwin leave it indeterminate, but incline to the Buddhist chronology. Such is the development of pantheism into materialism among six hundred millions of the most purely secular and unpoetic minds on earth. In their hands it is no mere dream of cosmogony, but a regular business affair, quite as much so as our Confession of Faith to us; indeed, much more practical.

The Chinese believe in the universal brotherhood of man with all other animals, and the possibility of raising any animal in due time, to manhood; and they show the sincerity of their faith in development by endeavoring to promote the

SANCTIFICATION OF THEIR DOGS, CATS, AND DONKEYS,

For this purpose they place them under the means of grace, in the precincts of some sacred temple or populous monastery, that the overflowing prayers of the priests may drop upon them, and make them good, pious animals, fit for a higher development in the next stage of being. Mrs. Nevius* thus describes one of these evolution Theological Seminaries: "We were met by

* *Our Life in China*, p. 150.

some boys with a few pretty gray squirrels, which they wished us to buy, not to carry away with us, but to set free again, in order to acquire merit which is supposed to accrue from the practice called *fang-seng* (letting go alive). A little further on a large snake was offered us for the same purpose.

"We were then on our way to visit an institution such as can be found, I presume, nowhere but in China, and very seldom even there. It was an 'Asylum for Animals,' connected with the monastery we had just left. Horses and donkeys, buffaloes and oxen, sheep and pigs, with numbers of fowls of every sort, are brought to this place in order to secure merit by so doing. It is supposed that animals which live and die under the influence of so holy an institution as the Yuing-si Monastery, are in a fair way to rise high in the scale of existence in another state. It is, then, only natural that many a favorite old animal is thus given a friendly shove by those whom it has served faithfully in the past."

(ii.) *The Greek Exposition of the Theory* appears to have been first formally made by Anaximander, about 600 B.C. He taught that the earth acquired its present solidity primarily, through the evaporation of a muddy ocean, by the heat of the sun. The mud, by the influence of the included air, swelled into multitudes of little bladders, which soon acquired horny shells and spines, became living beings, burst their shells, and came on dry land, which they greatly increased in bulk and solidity by the multitude of their shells. They went on developing into larger sizes, and higher forms of life, until at last man appeared, having also commenced life as an aquatic animal. It is remarkable how little the most recent European development of the theory by Mr. Darwin differs from this first exhibition by Anaximander. Mr. Darwin also asserts man's aquatic origin, and alleges

in proof the presence of his lungs, as a modified swim-bladder.

The theory was taken up and modified by succeeding philosophers. In endeavoring to account for the vast progress among such short-lived creatures, the Pythagoreans adopted the Eastern theory of the progressive transmigration of souls from inferior to higher bodies, and the reverse. The Neo-Platonists dwell upon it. The Jewish cabala takes it for granted, and builds on it. Porphyry develops it systematically. Origen rather likes it. A modern American divine, pursued by the difficulty of the origin of evil, hides his head in its umbrageous shades; supposing that the mystery of the origin of evil would be made plain by pushing back "The Conflict of Ages" into some unknown previous state of being.

(iii.) *From India, through the Greeks, the Evolution Hypothesis found its way among the Latins.* Rome, indeed, accepted Greece as her teacher of philosophy. The degrading code of morals taught by this gross materialism, and pilloried by the Apostle Paul in the memorable sentence, "Let us eat and drink, for to-morrow we die," contributed its full share to the putrefaction of society which ended in the downfall of the Roman empire.

It might have been expected that materialism would vanish before the progress of Christianity. But Papal Christianity adopted many of the worst errors of heathenism, and among them the notion of Unisubstancisme, or the essential oneness and convertibility of spirit and matter.

The doctrine of the possibility of the conversion of matter into mind, now so ably advocated by Professor Tyndall, Professor Huxley, and Mr. Herbert Spencer, accordingly received its greatest accession of popularity during the dark ages, from the scholastic divines of the

Romish Church. Paschasius Rudbert, in the eighth century, advocated the doctrine of transubstantiation. There was money to be made by it in those days. It became popular in both the Greek and the Romish Churches. It was clearly defined and fully accepted by the Council of Trent, Oct. 11th, 1551. Chapter IV.: "This holy synod doth now declare it anew, that by the consecration of the bread and of the wine, a conversion is made of the whole substance of the bread into the substance of the body of Christ our Lord; and of the whole substance of the wine into the substance of his blood." And in Canon I. of the same session: "If any one denieth that in the sacrament of the most holy Eucharist are contained truly, really, and substantially the body and blood, together with the soul and divinity of our Lord Jesus Christ, and consequently the whole Christ; but saith that he is only there as in a sign, or in figure, or virtue, let him be anathema." The acceptance of this doctrine by the great majority of the people and clergy of the Greek and Romish Churches so debauched the minds of men that they were prepared to accept any lesser absurdity. Transubstantiation, if a fact, is beyond controversy the most prominent instance on record of the instantaneous conversion of dead into living protoplasm, with all its properties of life, soul, and divinity. In this last word the Council soars above the modern evolutionists; it out-Tyndalls Tyndall. He has not advanced so far as his teachers in the doctrine of Unisubstancisme. Transubstantiation educated men into a readiness for other scientific superstitions; and prepared papal Europe to swallow evolution.

(iv.) *The Modern Development of the Theory.* The discussion of the subject has been prosecuted rather by the naturalists than the theologians. De Mallet took up the subject systematically, in the eighteenth century, in

his *Telliamed;* a work written in consequence of a revelation made to him by a voice as he lay sick. All animals, it was revealed to him, originated in the water. The sea has been receding from the tops of the loftiest mountains, leaving its remains behind. When fishes were thrown upon dry land, their pectoral fins and scales split up from evaporation, and became feathers; while their posterior fins were changed into feet. It would be very convenient to fishmongers if stale fish would be good enough to perform similar metamorphoses now; if, for instance, a cod-fish a week out of the water would convert itself into a goose, and a tray of stale trout become a dozen of lively chickens. However, this skeptical philosopher assures us of some equally wonderful facts, illustrative of the interesting metamorphosis of fish into men, and the converse; as the case of a sailor who, having fallen overboard, and lived in the water eight years, "became covered with scales from the squammifying power of the sea." This, however, is the converse of the development dogma, and illustrates rather the force of circumstances—of the environment—than of appetencies. But another of his facts is quite appropriate—the mermen frequently caught by the Dutch sailors, who spoke Dutch, and asked for a pipe of tobacco—a very curious instance of appetency, and implying also the possession of waterproof matches, and a host of nicotianic belongings; not more wonderful, however, than the developments asserted by the other development philosophers.

It is unnecessary here to trace the European progress of the theory into the development of the primeval germs or *monera* into the existing species of plants, animals, and man; as we shall have occasion to review the successive theories hereafter, when treating of Mr. Darwin's transmutation of species. We need only notice here those theories which have some appearance of novelty or

of originality in their conception of the *origin* of life, as distinct from its development.

The most recent discovery has been made by M. Tremaux; but, as usual with these philosophers, it conflicts seriously with the theories of his predecessors in that field. M. Tremaux makes men and beasts a crop; but he derives the character of the crop, not from the seed, according to our usual ideas, but from the soil. It is the soil which determines whether we shall see wheat, or corn, or oats, or birds, or fishes, or men. Mother Earth, according to him, and not the sea, as Mr. Darwin puts it, is the mother of all life. The grand and simple basis of his system may be stated as exactly the reverse of the Bible statement, that "God made man out of the dust of the ground." He alleges that the dust of the ground made man out of itself, and all other beasts also. The differences in the crops he deduces from the differences in the soil,—the recent geological formations, compounded of a great variety of materials, produce higher grades of life; those of the primitive formations tend to degradation. In short, man and animals are crops depending principally on the richness of their native dunghills for their materials, somewhat on the climate, and being modified by the effect of frequent crossings, and a change of alimentary productions, which takes place in a sensible degree between neighboring countries. The well-known characteristic differences of the races all lie in the soil and kitchen. The difference between the Englishman and the Irishman is chiefly the result of the difference between the bread and beef and ale, and the potatoes and buttermilk and whiskey, which respectively edify the solid Saxon or the fervid Celt. Put John on a potato diet, and keep him long enough on it, and he becomes Paddy.

We have thus, it seems, got around again to the old

heathen doctrine taught by Lucretius, whom some of our evolutionists are proud to praise as their predecessor. Our classical readers will remember his well-known lines beginning—

"Linguitur, ut merito, maternum nomen adepta;"

which Mr. Munro translates: "With good reason the earth has gotten the name of mother, since all things are produced out of the earth. And many living creatures, even now, spring out of the earth, taking form by the rains, and the heat of the sun."*

Professor Carl Vogt, of Geneva, meets a difficulty of the Lucretian theory thus: "If it be difficult to conceive how the great diversities of organic types could have been developed from a common soil, it can, on the other hand, not be denied that an intrinsic difference in the constitution of this soil may have given rise to the diversity of types springing from it."† That is, the mud made a crop of eels, the sand-hills produced rabbits, the Athenians sprung from their own soil, and Geneva grows evolutionists, as its autochthones or native stock.

And so it seems that this vaunted latest discovery of modern materialistic science is only the old putrid heathenism of Greece and India and China. It is as fresh as the mummy of Sesostris.

And it comes to us tried and found poisonous by these nations. By its fruits we shall know it. We can have no difficulty in seeing its fruits. Its record is against it. It carries the yellow flag. Chinese leprosy is on board. It sunk heathen Rome into vice and weakness and decay. It has reduced Burmah and China to their present stupid degradation. Let those who admire Chinese civilization adopt its philosophy. For the faith is the soul of the civilization. But we reject with disgust this rotten

* *De Rerum Natura*, Lib. v. pp. 793-796.

† *Lectures on Man*, p. 446.

heathen materialism, and believe in Almighty God as the Lord and Giver of Life.

2. *This old Superstition, of Mother Earth Originating all Plants and Animals by her own Natural Powers, is Contrary to all the Facts of Experience and Observation.*

It was the natural product of ages of ignorance. Men saw the earth in spring putting forth innumerable buds, and spires of grass, and blossoming plants, and why not also animals and men? The untaught negroes of the South readily became evolutionists. When, in *Uncle Tom's Cabin*, Miss Ophelia begins to teach Topsy her catechism, by asking, "Who made you?" Topsy readily answers, "'Spect I nebber was made; jest growed." Topsy is in the evolution stage of education. But as Topsy extends her range of observations, she discovers that things generally grow from seeds. The class of self-originated things diminishes upon closer observation. It was once generally believed that the carcass of Samson's lion bred the bees found there a year after his death; but closer research showed that they had only hived in it. It was not doubted for centuries that butchers' meat bred the maggots sometimes found in it, and that other creeping things were thus brought forth. Lucretius says, "Living creatures even now spring out of the earth, taking form by the rains and the heat of the sun."

It was not till the seventeenth century that Francesco Redi began to doubt this first principle of evolution. He saw the flies swarming about the butcher's shops, and suspected that they laid eggs, like bees, and that they deposited their eggs in the meat, and that the maggots were hatched from the eggs of the flies. To test this, he put some meat in jars and tied fine gauze over their mouths. The flies swarmed about the jars, and laid their eggs or living offspring on the gauze, but no maggots appeared in the meat. He put some of the same meat

in jars not protected by the gauze, and it was soon swarming with maggots. Then the microscope was employed, and the eggs of the flies were made visible to the eye; and people were convinced that the flies were as truly hatched as geese or chickens. The Italian's process of demonstration has been since employed on many other species of small creatures, until it was generally owned that all life is from the egg.

But this fact, if universal, would be fatal to the hypothesis of evolution. The famous old question, Whence came the chicken that laid the first egg? must be answered; and evolution cannot answer it. So the evolutionist casts around for some self-originated living beings. It happened that in 1836, electricity and galvanism were beginning to work their wonders in England, and Mr. Andrew Crosse found in the bath of his battery, composed of a caustic solution, some living mites. The discovery was hailed with triumph by the evolutionists. Galvanism, they declared, was the principle of life. If it could make mites, living mites, out of dead matter, why could it not in time make men? But Prof. Schultz set to work, upon Redi's plan of excluding the eggs, by excluding carefully the atmospheric air, which is full of all sorts of germs. The result was, that no mites were made by the battery. It was simply a nest for hatching the eggs deposited from the atmosphere. And so, the galvanic bath insects were conceded to be bred from eggs.

But the infusorial animalcules reopened the controversy. They swarm in infusions of hay, or of any vegetable or animal substances, and, under the forms of mould and other putrefactive organisms, are great nuisances to housekeepers, destroying their jams and jellies upon exposure to the air. Some of them are only $\frac{1}{40000}$ of an inch in diameter. Could such small creatures have germs? Buffon thought it impossible, and put forth his

theory of organic molecules—molecules of living matter, the union of a multitude of which made a man, as the union of drops of water made a river. Perhaps these little creatures were Buffon's organic molecules. Needham tried to demonstrate that boiling the water would not prevent their appearance; but his apparatus was very defective. Animalcules appeared after the boiling. So the question of the spontaneous generation of the animalcules remained open, till Spallanzi, by boiling his infusion in long-necked glass flasks, and hermetically sealing them by melting their necks with a blow-pipe, completely excluded the air, and so the germs, and found no infusoria in his solutions.

Up to this point the existence of germs of creatures only $\frac{1}{40000}$ of an inch in diameter had been only an inference; nobody had ever seen them. Nobody, it was thought, could ever see such little things. But to Prof. Tyndall belongs the honor of giving an ocular demonstration of the existence of these ultra-microscopic germs. He noticed the motes floating in a sunbeam passing through a key-hole, and saw that the air is a perfect stir-about, filled with tens of thousands of specks; and he conceived the idea of testing them, whether they were germs or not. The passage of the air through cotton wool left a multitude of minute solid particles almost wholly destructible by heat, upon the wool; and these, when sowed in suitable solutions, bred animalcules. But what of those too small for even the solar beam to render visible? He found a method of rendering them visible in the mass, as the blue vapor of water is made visible in the sky, though we cannot see each of the minute drops. He passed the electric beam of light through air charged with these ultra-microscopic germs, which reflect the beam of light, being solid bodies, and so rendered it visible. But if the air is free of them, no light is visible.

He made chambers with glass windows on opposite sides, and lined with glycerine, into which the air was allowed access, and permitted to stand for some days, to settle itself. When the electric beam was passed through these chambers, though it was visible before entering, and after passing through them, it was invisible in the chambers. When the chambers were filled with common air, the beam of electric light was quite visible. The air which had been proved moteless was then supplied to all sorts of infusions, but, he says, "In no single instance did the air which had been proved moteless by the searching beam show itself to have the least power of producing bacterial life, or the associated phenomena of putrefaction." (*Eclectic Magazine*, vol. XXIII., 725.) This settled the case. The infusorial animalcules are bred from germs, like all other creatures. Exclude the air laden with these germs from your cans of peaches, tomatoes, or chicken, and, as every lady knows, they will keep for years. Millions of experiments in canned goods demonstrate the utter falsehood of the notion of the spontaneous generation of infusorial animalcules.

The question, then, of the existence of the spontaneous generation of either plants or animals is decided in the negative by the best observers. After many years of most patient observation, not a single case of the appearance of any living thing save as the product of previous life, has ever been observed. Those cases supposed to present exceptional examples of the spontaneous generation of low or of small forms of life have, upon closer examination, been found to be no exceptions to the general rule—that all life is from the egg. The testimony is so convincing that even those evolutionists whose theory demands some such facts for its support, candidly acknowledge that, as yet, none have been found.

Professor Tyndall, in a lecture before the Royal Institution, in London, in 1877, after describing his labors for eight months, already referred to, thus sums up the matter: "From the beginning to the end of the inquiry there is not, as you have seen, a shadow of evidence in favor of the doctrine of spontaneous generation. There is, on the contrary, overwhelming evidence against it; but do not carry away with you the notion sometimes erroneously ascribed to me, that I deem spontaneous generation 'impossible,' or that I wish to limit the power of matter in relation to life. My views on this subject ought to be well known. But possibility is one thing, and proof is another; and when in our day I seek for experimental evidence of the transformation of the non-living into the living, I am inexorably led to the conclusion that no such evidence exists, and that in the lowest, as in the highest of organized creatures, the method of nature is that life shall be the issue of antecedent life."*

Dr. Huxley is equally candid in denying that any case of what he calls abiogenesis—genesis without life preceding—has been proven. Replying to the allegation "that hermetically sealed fluids which have been exposed to great and long continued heat, have sometimes exhibited living forms of low organizations, when they have been opened," he says: "The first reply which suggests itself is, the probability that there must be some error about the experiments, because they are performed on an enormous scale every day, with quite contrary results. Meats, fruits, vegetables, the very materials of the most fermentable and putrescible infusions, are preserved, I suppose I may say, to the extent of thousands of tons every year, by a method which is a mere application of Spallanzi's experiment. The matters to be preserved are all boiled in a tin case provided with a small hole, and this hole is

*San Francisco *Daily Evening Bulletin*, July 17, 1877.

soldered up when all the air in the case is replaced by steam. By this method they may be kept for years without putrefying, fermenting, or getting mouldy. Now this is not because oxygen is excluded, inasmuch as it is now proved that free oxygen is not necessary for either fermentation or putrefaction. It is not because the tins are exhausted of air; for *vibriones* and *bacteria* live, as Pasteur has shown, without air, or free oxygen. It is not because the boiled meats or vegetables are not putrescible or fermentable, as those who have had the misfortune to be on a ship supplied with unskilfully prepared tins well know. What is it therefore but the exclusion of germs? . . . . But if in the present state of science the alternative is offered us, either germs can stand a greater heat than has been supposed, or the molecules of dead matter, for no valid or intelligible reason that is assigned, are able to rearrange themselves into living bodies exactly such as can be demonstrated to be frequently produced in another way, I cannot understand how choice can be, even for a moment, doubtful."*

Testimonies from Spencer, Thallinger, and Burton Sanderson, and from the leading German investigators, equally decisive, might be cited; but our space forbids. The fact is established on scientific grounds, that no such thing as spontaneous generation has ever been demonstrated as a fact. It is utterly contrary to all observation and experience, which uniformly show every living thing observed as deriving its life from a living parent of the same species. And since the laws of nature are alleged by the evolutionists to be unchangeable, we have every reason to conclude that no instance of spontaneous generation ever occurred on our earth.

3. *The Theory of Spontaneous Generation is Unscientific, Suicidal, and Absurd.*

* *Lay Sermons* p. 365.

When compelled to own that there is no spontaneous generation going on now, our evolutionists hasten to put in a demurrer to our argument thence against its former existence. They claim that the conditions of the ancient earth were so different in geological times, and so much more favorable to life, that it may have been possible then for the Mother Earth to originate life, though it is not practicable now; and that though chemistry has not yet succeeded in producing life, it is only yet in its infancy, and may be lucky enough to achieve the feat at some future time.

Thus Dr. Huxley follows up his candid confession of the absence of proof of abiogenesis as follows (*Lay Sermons*, p. 366): "But though I cannot express this conviction of mine too strongly, I must carefully guard myself against the supposition that I intend to suggest that no such thing as abiogenesis has taken place in the past, or ever will take place in the future. With organic chemistry, molecular physics, and physiology yet in their infancy, and every day making prodigious strides, I think it would be the height of presumption for any man to say that the conditions under which matter assumes the properties we call 'vital,' may not some day be artificially brought together. All I feel justified in affirming is, that I see no reason for affirming that the feat has been performed yet."

To which the answer is conclusive. When the feat is performed, we will see and believe. But *science* is not founded on future possibilities, but on accomplished facts. Dr. Huxley is conscious of the silliness of such a scientific discounting of the unknown future, and falls back upon the unknown past as follows, on the same page: "And looking back through the prodigious vista of the past, I find no record of the commencement of life, and therefore I am devoid of any means of forming a definite conclu-

sion as to the condition of its appearance. Belief, in the scientific sense of the word, is a serious matter, and needs strong foundations. To say, therefore, in the admitted absence of evidence, that I have any belief as to the mode in which the existing forms of life originated, would be using words in a wrong sense. But expectation is permissible where belief is not; and if it were given me to look beyond the abyss of geologically recorded time, to the still more remote period when the earth was passing through physical and chemical conditions which it can no more see again than a man can recall his infancy, I should expect to be a witness of living protoplasm from not living matter. I should expect to see it appear under forms of great simplicity, endowed like existing fungi with the power of determining the formation of new protoplasm from such matters as ammonium, carbonates, oxalates, and tartrates, alkaline and earthy phosphates, and water, without the aid of light. That is the expectation to which our logical reasoning leads me. But I beg you once more to recollect that I have no right to call my opinion anything more than an *act of philosophical faith.*"

Just so! An act of philosophical faith! Faith in an unproved supposition; and in a supposed fact which, by his own confession, can never be proved to be true! Never till a man can recall his infancy, can Dr. Huxley establish the truth of one of the fundamental dogmas of the theory of evolution—that all living beings came into existence by the unaided powers of lifeless matter. The confession is his own. The words are his own. On this baseless and unproved and unprovable supposition, he plants the ladder which leads to the antipodes of heaven. And he expects us to follow him down there! By Dr. Huxley's own confession we see that the belief in spontaneous generation is unscientific. And so falls the

so-called scientific fabric of the theory of evolution, built upon it. It is only an unprovable supposition, and the belief of it is merely scientific superstition—more contemptible than faith in the legendary miracles of the dark ages. They appeal to us as alleged facts. Dr. Huxley appeals, not to alleged facts, but only to expectations incapable of fulfilment, that is, to confessed fiction. He is not quite so happy as Micawber, since he does not expect any thing to turn up.

Professor Tyndall makes a little more show of scientific evidence for his faith in the spontaneous generation of the first animals. He discovers, he thinks, or imagines, "in matter, the promise and potency of all terrestrial life."* "Those who hold the doctrine of evolution, are by no means ignorant of the uncertainty of their data, and they only yield to it a provisional assent. They regard the Nebular Hypothesis as probable, and in the utter absence of any evidence to prove the act illegal, extend the method of nature from the present into the past. Here the observed uniformity of nature is their only guide. Within the long range of physical inquiry they have never discovered in nature the insertion of caprice. Throughout this range the laws of physical and intellectual continuity have run side by side. Having thus determined the elements of their curve, in a world of observation and experiment, they prolong that curve into an antecedent world, and accept as probable the unbroken sequence of development from the nebula to the present time."†

In his *Belfast Address*, p. 524, he gives us some of the elements of this wonderful curve, which may enable us to discover the probability of its being prolonged into truth in geologic times. For if its elements as observed

* *Belfast Address.*

† *Scientific Use of the Imagination*, p. 456.

now be undoubtedly erroneous, their prolongation must be the prolongation of the error. We have seen his acceptance of the probability of the absurd and impracticable Nebular Hypothesis as one of its elements. His physiology is as erroneous as his astronomy. He says: "On tracing the line of life backwards, we see it approaching more and more to what we call the purely physical condition. We come at length to those organisms which I have compared to drops of oil suspended in alcohol and water. We reach the *protogenes* of Haeckel, in which we have a type distinguished from a fragment of albumen only by its finely granulated character."

Now here is a wonderful jumble of self-contradiction, and contradiction of science. He says these little organisms "approach the purely physical condition." Not at all. He owns that they are living. The purely physical condition is not living; it is dead. There is not, there cannot be any middle ground between life and death. There can be no approach from one to the other. A thing must be either dead or alive. Then he alleges that these little creatures are extremely simple, mere shreds of albumen. But Dr. Huxley will correct his misapprehension, since they are composed of living protoplasm, having, as Dr. Huxley has demonstrated, "the same powers and faculties," the same "form," and the "same substantial composition," as that of Professor Tyndall himself. Dr. Elam affirms* "There is nothing to justify us in concluding that in the *protogenes* there is any approach whatever to the purely physical condition. The line of demarkation between this 'fragment of albumen' and any inorganic matter is as defined, if not as wide, as that between the eagle and the rock on which the eyry is built. The protoplasm of the *protogenes* is, originally at least, as active as that of any other

* *Eclectic Magazine*, vol. xxv., p. 175.

organism; its formation from inorganic matter equally defies our efforts; its functions are as incapable of expression by any physical formula. On what grounds then, scientific or transcendental, can we expect to hear this form of life declare, 'I came direct from the universal mother, who brings forth all things as the fruit of her womb, and I own no other parentage.' Surely in this we should observe no '*unbroken* sequence of development from the nebula to the present time.' And what has become of the 'observed uniformity of nature?'"

Thus the notion of spontaneous generation in the past is fatal to the continuity of evolution. It breaks the curve. Every organism known to man, from the mammoth to the mite, and down even to the *monera*, has come into life as the product of a previous life. Professor Tyndall prolongs the curve into the pre-geologic past, and says he finds the law of the continuity of life from life arrested; and another mode of origin of life from inorganic matter introduced. Organisms spring from inorganic matter. Life comes from death. Where, then, is the law of continuity? Gone! Evolution has committed suicide! Dashed out its brains against that first pollywog!

The unscientific character and suicidal conduct of this self-contradiction by evolutionists is well displayed by a prophet of their own, Mr. Herbert Spencer, as follows: "That creatures having *quite specific structures* are evolved in the course of a few hours, without antecedents calculated to determine their specific forms, is to me incredible. Not only the established truths of biology, but the established truths of science in general, negative the supposition that organisms having structures definite enough to identify them as belonging to known genera and species, can be produced in the absence of germs derived from antecedent organisms of the same genera and

species. . . . . The very conception of spontaneity is wholly incongruous with the conception of evolution. . . . . No form of evolution, inorganic or organic, can be spontaneous; but in every instance the antecedent forces must be adequate in their kinds, and qualities, and distributions to work the observed effects. . . . . The supposed spontaneous generation habitually occurs in menstrua that contain either organic matter, or matter originally derived from organisms. By what kind of logic, then, is it inferable that organic life was initiated after a manner like that in which *infusoria* are said to be now spontaneously generated? Where, before life commenced, were the superior organisms from which these lowest organisms derived their organic matter?"*

THE FATAL SELF-CONTRADICTION.

Mr. Spencer perceives the fatal self-contradiction of admitting any spontaneity into a theory of evolution. But he fails to see that his own theory of eternal modifications of matter as the origin of life is subject to the same fatality; for what is life but spontaneity? These unscientific facts of life are terribly fatal to theories of evolution. Any beginning, either of life, or of the motion of the molecules, is contradictory to evolution.

But besides Prof. Tyndall's faulty logic, the theory is in itself unscientific. The notion that the forces of matter could originate life is utterly unscientific. The *spontaneous motion of the molecules of matter* is alleged by Haeckel and Büchner as the origin of life. But what is the origin of the motion of the molecules of matter? What started them to move? If the universe had been eternally full of them, they could not move. Not one of them could budge a hair's-breadth. If it was only eternally half-full of them, they might possibly have moved;

* *Appleton's Journal*, No. 18, p. 563, and No. 19, p. 548.

but having begun to move toward each other by gravitation in the beginning of eternity, they must have completed their course millions of millenniums ago, and must have been all crammed into one heap, stock-still for evermore. No matter how small you make your molecules, if they are matter, they have had length, breadth, and thickness, gravity and impenetrability; and they could no more move a hair's-breadth without a cause outside of themselves than the paving stones in the street.

Then, again, we demand a *reason* for their motion. Why should decent inorganic molecules seek organization? Why, after an eternity of contented well-to-do existence in gas and crystal lives, should they rush into the pollywog-breeding business, with all its risks and disappointments? Any respectable regular crystal ought to be ashamed of itself for becoming the father of sons capable of the absurdities of the evolutionists. Organization is on a plan, a purposed combination of parts for the benefit of the whole organism. Were the molecules of oxygen, hydrogen, nitrogen, and carbon, which met to manufacture the first organism, animated by such a public spirit that each resolved to sink its own individual existence for the common good, and, in the spirit of Marcus Curtius, leap fully armed into the yawning gulf separating life from death in the midst of the forum of the Capitol of evolution? But if no sufficient reason can be given for the very extraordinary and unparalleled conduct of the molecules which united to form the first organism; and if, as evolutionists allege, they had no reason, but just united for fun, no reason any better can be given for any of their successors' actions; and so all the world is only a big muddle, and the attempt to form a theory of evolution, or any other theory, can only be the spinning of a rope of sand.

But even should we attribute enough intelligence to

the molecules to design their confederation, or accept the theory that they came together by chance, as some of the ancient and modern evolutionists hold, still the question arises, Had they capital enough to go into the business of organization? Our evolutionists display their stock in trade, consisting of materials—oxygen, hydrogen, nitrogen, carbon, and the like—as materials of protoplasm. All very good so far as it goes, but a brick pile is not a house; nor is a barrel of beef an ox. We need a great deal more than the materials of protoplasm to make life. All these are found in great abundance in a dead mule; but we want one alive and able to work. But the molecules have not the least idea how to give life to a dead mule, or to a dead molecule. There is no force in nature able to inspire life. On the contrary, all the forces of nature are antagonistic to life, and the struggle for existence, which Mr. Darwin so eloquently describes, is the struggle of life against the powers of nature. Every drop of water conveyed by a plant from the ground to the top of its leaf, every step or motion made by any animal, is a struggle against the force of gravitation. The laws of chemical affinity, appealed to as the great forces in evolving life, operate in exactly the contrary direction; they cause death and decomposition, when life ceases its resistance. The gastric juice will eat its way through the stomach which secreted it, when that stomach has ceased from the struggle of life. The very familiar illustration of the difficulty of preserving dead vegetables and meats attests the destructive power of the forces of matter if not counteracted by some superior intelligence. Mr. Spencer pompously announces the heat of the sun as the sufficient force originating all life. But the sun might shine on his solutions of smelling-salts to all eternity without producing the smallest fungus, unless the seeds were previously there. The forces of inorganic

matter can destroy, but cannot possibly impart or originate life.

Finally, the idea of the origin of life by the co-operation of the forces of inorganic matter is unthinkable. Dr. Huxley well says, that the first duty of a hypothesis is to be intelligible. I ask, Does Dr. Huxley, or any other doctor, understand what he says when he asserts that life was produced by the mechanical, or if he pleases, the chemical union of the molecules and their powers? All matter, whether found in mountains or in molecules, is extended, and divisible, and may be weighed and measured; and cannot lose these properties by any change of form, say into sensation. Let us try to conceive a pound weight of music! or an inch or two of eyesight! or an ounce of taste! or, since our spontaneous generationists are so fond of smelling-salts, by what chemistry would they transform a hogshead of them into the sensation of smell? What kind of acid and alkali will they unite to form the sense of hunger? Or what dual compound of chemistry enjoys the satisfaction of a good dinner? The properties and powers of inorganic matter are incommensurable with those of life. To say that vital actions are merely the results of the motions of the matter of the living body, is to utter words which have no intelligible meaning, unless one should suppose them an illustration of Dr. Huxley's theory—that they are mere protoplasm; protoplasm not yet informed with sense or reason. No conceivable amount of carbon, or oxygen, or hydrogen could produce an idea; nor can any known chemistry even analyze a proposition, much less construct a process of reasoning. To say that our Lord's Sermon on the Mount is simply the necessary result of the accidental meeting of four molecules of oxygen, hydrogen, nitrogen, and carbon some millions of years ago—and the evolutionist must say just that—is to utter a statement which

all the evolutionists in the world could not make intelligible to any man of common sense. The notion of the origin of the world's life from some atoms of lifeless, inorganic matter is utterly unthinkable, self-contradictory, and absurd.

THE ONLY ALTERNATIVE.

Spontaneous generation then having been demonstrated to be false, impossible, and absurd, we fall back on the only alternative—creation. This is a supernatural act, and therefore inexplicable by science, which confines its investigations to nature; though at the last, as we have seen, it is compelled to admit a power beyond nature. But the idea of the creation of life by the Living God, though it transcends our reason, does not contradict it; seeing that it provides a sufficient cause for the proposed effect, and the only sufficient power and wisdom conceivable by man.

The Bible thus describes the creation of life by God, in the first chapter of Genesis: "And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself upon the earth. And it was so. And the earth brought forth grass, and the herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind; and God saw that it was good. And the evening and the morning were the third day.

"And God said, Let the waters bring forth abundantly the moving creature that hath life; and fowl that may fly above the earth in the open firmament of heaven. And God created great whales, and every living creature that moveth, which the waters brought forth abundantly after their kind, and every winged fowl after his kind; and God saw that it was good. And God blessed them, saying, Be fruitful and multiply, and fill the waters in the

seas; and let fowl multiply in the earth. And the evening and the morning were the fifth day.

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

Such is the sublime and simple account of the origin of all life on our earth, from the word of the Eternal Lord and Giver of Life. To Him let every thing that hath life give praise. Amen.

THE ORIGIN OF SPECIES.

THE ERRORS OF EVOLUTION.

DARWINISM.

THE ORIGIN OF SPECIES.

In examining the Errors of Evolution we have considered the notion of the self-origination of plants and animals by the spontaneous motions of the molecules of the matter composing them. We have seen that such a mode of the origin of life is impossible; and that the theory is self-contradictory and absurd. In the present writing we proceed to examine the theory of the development or evolution of all the various orders and species of plants and animals, from a few primeval germs.

This idea is a very ancient superstition. It was banished from Christendom by the Bible account of the creation of distinct species directly by God. The way for the return of this old heathenism was prepared by the belief in the possibility of the transmutation of species in transubstantiation. It was re-introduced in Europe by De Maillet, Oken, Lamarck, and the author of *The Vestiges of Creation.* But it owes its present popularity to the late Mr. Charles Darwin, whose theory has supplanted those of all his predecessors. We shall, therefore, confine our attention to it, for if it be shown to be erroneous, none of its less probable and possible competitors can stand.

Mr. Darwin gives the following abstract of his theory and argument (*Origin of Species*, p. 404): "As this whole volume is one long argument, it may be convenient to the reader to have the leading facts and inferences briefly recapitulated. That many and serious objections may be advanced against the theory of descent with modifications, through variation and natural selection, I do not deny. I have endeavored to give them their full force. Nothing at first can appear more difficult to believe than that the more complex organs and instincts have been perfected, not by means superior to, though analogous with, human reason, but by the accumulation of innumerable slight variations, each good for the individual possessor. Nevertheless this difficulty, though appearing to our imagination insuperably great, cannot be considered real if we admit the following propositions, namely, that all parts of the organization and instincts offer at least individual differences; that there is a struggle for existence leading to the preservation of profitable deviations of structure or instinct; and lastly, that gradations in the state of perfection of each organ may have existed, each good in its kind. The truth of these propositions cannot, I think, be disputed."

After stating that the causes of the origin of variations in domestic animals are the changes produced by domestication in their conditions of life, and our cherishing of improved varieties, he says, in his *résume* (*Origin of Species*, p. 411): "There is no reason why the principles which have acted so efficiently under domestication, should not have acted under nature. In the survival of favored individuals and races, during the constantly recurring struggle for existence, we see a powerful and constantly acting form of selection. The struggle for existence inevitably follows from the high geometrically rate of increase which is common to all organic beings.

This high rate of increase is proved by calculation—by the rapid increase of many animals and plants during a succession of peculiar seasons, and when naturalized in new countries. More individuals are born than can possibly survive. A grain in the balance may determine which individuals shall live, and which shall die—which variety or species shall increase in number, and which shall decrease, or finally became extinct. As the individuals of the same species come in all cases into the closest competition with each other, the struggle will generally be most severe between them; it will be almost equally severe between varieties of the same species, and next in severity between species of the same genus. On the other hand, the struggle will be often severe between beings remote in the scale of nature. The slightest advantage in certain individuals at any age or during any season, over those with which they come into competition, or better adaptation, in no matter how slight a degree, to the surrounding physical conditions, will in the long run turn the balance.

"With animals having separate sexes, there will be in most cases a struggle between the males for the possession of the females. The most vigorous males, or those which have most successfully struggled with their conditions of life, will generally leave most progeny. But success will often depend on the males having special weapons, or means of defense, or charms, and a slight advantage will lead to victory."

After going on to argue that such variations may reach to a transmutation of species, he continues: "If, then, animals and plants do vary, let it be ever so slightly or slowly, why should not variations or individual differences which are in any way beneficial be preserved or accumulated through natural selection, or the survival of the fittest? If man can by patience select variations useful

to him, why, under changing and complex conditions of life, should not variations useful to nature's living products often arise and be preserved as selected? What limit can be put to this power, acting during long ages, and rigidly scrutinizing the whole constitution, structure, and habits of each creature—favoring the good, and rejecting the bad? I can see no limit to this power in slowly and beautifully adapting each form to the most complex conditions of life. . . . . New and improved varieties will inevitably supplant the older, less improved, and intermediate varieties; and thus species are rendered to a large extent defined and distinct objects." He applies the same principle to the formation of genera and groups, and also to the instincts of insects and animals.

He unflinchingly traces the most diverse appearances of organization to this common origin, p. 420: "The similar framework of bone in the hand of a man, wing of a bat, fin of the porpoise, and leg of the horse; the same number of vertebræ forming the neck of the giraffe, and of the elephant; and innumerable other such facts, at once explain themselves on the theory of descent with slow and slight successive modifications. The similarity in pattern in the wing and in the leg of a bat—though used for such different purpose; in the jaws and legs of a crab, in the petals, stamens, and pistils of a flower, is likewise, to a large extent, intelligible in the view of the gradual modification of parts or organs which were aboriginally alike in an early progenitor, in each of these classes. . . . . Species have been modified during a long course of descent . . . . chiefly through the natural selection of numerous successive, slight, favorable variations, aided in an important manner by the use and disuse of parts, and in an unimportant manner, that is in relation to adaptive structures whether past or present, by the direct action of external conditions, and by variations which seem

to us in our ignorance to arise spontaneously." p. 421.

"It may be asked, How far I extend the doctrine of the modifications of species?" (p. 424). . . . . "I cannot doubt that the theory of descent with modifications embraces all the members of the same great class or kingdom. I believe that animals are descended from, at most, only four or five progenitors, and plants from an equal or lesser number."

"Analogy would lead me one step farther, namely, to the belief that all animals and plants are descended from some one prototype. But analogy may be a deceitful guide. . . . . And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress toward perfection. . . . Thus from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms, or into one; and that while this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning, endless forms, most beautiful and most wonderful, have been and are being evolved." p. 429.

Every Christian reader rejoices to see Mr. Darwin close his book with this confession of the Creator.* He thus

* Our readers will rejoice to learn that Mr. Darwin's confession of God was made not only with his pen, but with his purse. He was a regular supporter of Christian missions, as the subjoined extract from *The Christian Statesman* testifies:

It is interesting to learn, from a letter published in the *Daily News*, on the 22nd inst., by the Rev. R. J. Simpson, Clerical and Metropolitan Secretary of the South American Missionary Society, that the late Professor Darwin, who was well acquainted with the southern part of South America, was not only a subscriber but a warm supporter of the society up to the time of his death. This aid he gave as a direct result of his admiration and thankfulness for the practical good and the wondrous change effected by the labors of the society among the inhabitants of Tierra del Fuego. The following extract from an address delivered by Admiral Sir J. B. Sulivan, at the annual meeting of the South American Missionary Society in 1881, adverting to the improvement among the natives, speaks for itself:

"He stated that fact in writing to his friend, Mr. Charles Darwin, who was one of the party in the *Beagle*, and that gentleman wrote back that he could not have be-

escapes the difficulties and absurdities of the theory of spontaneous generation of living beings, by admitting that the Creator breathed life originally into a few simple forms. He thus places himself among the theistic evolutionists. As this admission logically involves the Creator's foresight of all the future development of these original germs, and his endowment of them with all the powers necessary to it, and all the environment of air, earth, and water, and all the regulation of climates, and all the succession of geological revolutions, and all the atmospheric phenomena which are equally necessary to their evolution—the argument for the being, wisdom, and power of God from the creation of the half-dozen original germs, is, to a logical mind, as strong as that from the immediate creation of every living thing produced by them. The creation of Adam demonstrates the existence and character of the Creator as truly as though he had created the whole human race in Eden. Indeed, Mr. Spencer argues that there is a greater display of wisdom in evolution than in creation. At any rate, evolution can never establish atheism. Creation by law is as divine as creation by command.

Mr. Spencer is not the only one, nor the first, to assert this doctrine. The theological view of evolution has been maintained in past ages by St. Augustine and St. Thomas Aquinas. St. Basil speaks of the continued operation of natural laws in the production of all organisms. St. Thomas says: "In the institution of nature we do not look for miracles, but what belongs to the nature of

lieved that all the missionaries in the world could ever have made the Fuegians honest. A year or two ago something which he had read in one of the society's magazines led Mr. Darwin to write to him on that subject. He had long said that nothing could be done by means of mission work, that all the pains bestowed on the natives would be thrown away, and that they could never be civilized. He afterwards admitted that he was wrong, and at the period to which he (Admiral Sulivan) had just alluded he wrote to him: 'I had always thought that the civilization of the Japanese was the most wonderful thing in history, but I am now convinced that what the missionaries have done in Tierra del Fuego in civilizing the natives is at least as wonderful.'"

things, as St. Augustine says." (Sum. I.—lxvii. 4 ad 3.) And in a similar strain we find modern divines asserting that the proofs of the existence of the Supreme Intelligence would not be destroyed were evolution established as a fact. Dr. M'Cosh devotes the first chapter of his work, *Christianity and Positivism*, to the illustration of the evidences of design given by the supposed evolution from the primeval fire-mist; and engages that, if the theory of evolution and spontaneous generation should be established while he is alive, to demonstrate that it necessitates God to originate and operate it. The Duke of Argyle sees nothing atheistic in creation by law. And leading evolutionists, like Mr. Huxley, affirm (*Critiques and Addresses*, p. 272,) that "Darwinism does not affect the doctrine of final causes." Mr. Wallace, one of the originators of Darwin's theory, says (*Natural Selection*, p. 368), after showing that we have no direct knowledge of any force in the universe but our own will-power, "If, therefore, we have traced one force, however minute, to an origin in our own WILL, while we have no knowledge of any other primary cause of force, it does not seem an improbable conclusion that all force may be WILL-FORCE; and thus that the whole universe is not merely dependent on, but actually *is* the will of higher intelligences, or of one Supreme Intelligence." And Professor Owen (*Anatomy of Vertebrates*, Chap. xl.), sums up the argument for design in a sentence which defies refutation: "A purposive route of development and change, of correlation and inter-dependence manifesting intelligent will, is as determinable in the succession of races as in the development and organization of the individual. Generations do not vary accidentally in any and every direction, but in pre-ordained, definite, and correlated courses." We might multiply citations, but these are sufficient to refute the claims made by French and German writers, that

Darwinism destroys the proof from design of the being and government of God. Logically it cannot have any such effect.

Having owned the necessity of the Creator to originate life, it was quite logically competent to claim his superintendence of its evolution. But Mr. Darwin's mind is not logical, neither is his system; for he sets himself to argue against design in the structure of animals, even in those structures which everybody calls contrivance, and which he himself calls contrivance. The fins were not made according to a plan on purpose for the fish to swim with them; but having accidentally found itself in possession of fins it used them for swimming. The great distinguishing feature of Darwinism is, the substitution of natural selection for the power, wisdom and goodness of God in the formation and development of the bodies and minds of animals and men. This will appear from the following extracts, a few out of a multitude challenging citation.

Mr. Darwin repeatedly asserts the absence of design in the structures of plants and animals, and repeatedly alleges his doctrine as antagonistic to it. In a passage already cited (*Origin of Species*, p. 404), he says, "Nothing, at first view, appears more difficult to believe than that the more complex organs, like the eye, and instincts, as of the ants and bees, have been perfected, not by means superior to, but analogous with, human reason, but by the accumulation of innumerable slight variations, each good for the individual possessor." His book is devoted to the proof of this difficult belief. He repudiates the doctrine of innate and necessary development, and argues for that of "natural selection, or the survival of the fittest," which implies only that variations or individual differences of a favorable nature occasionally arise in a few species, and are then preserved. (149.) He

defines his chosen phrase "natural selection," by defining nature as "the aggregate action and product of natural laws;" and says laws are "the sequence of events as ascertained by us." That we may not misunderstand him when he speaks of natural selection "as a power," he says, "but who objects to any author speaking of the attraction of gravity as ruling the movements of the planets?"

Mr. Darwin does not confine himself to mere reasoning; he permits himself to ridicule the idea of the superintending providence of God over trifles. He could have no sympathy with the idea that "even the hairs of our head are all numbered." He asks, "Did God ordain that the crop and tail-feathers of the pigeon should vary in order that the fancier should make his grotesque and fan-tail breeds? Did He frame the bodily and mental qualities of the dog to vary in order that a breed might be formed of indomitable ferocity, with jaws fitted to pin down the bull, for man's brutal sport? But if we give up the principle in one case—if we do not admit that the variations of the primeval dog were intentionally guided, in order, for instance, that the greyhound, that perfect image of symmetry and vigor, might be formed, no shadow of reason can be assigned for the belief that variations alike in nature, and the results of the same general laws, which have been the groundwork through natural selection of the most perfectly adapted animals in the world, man included, were intentionally and specially guided. However much we may wish it, we can hardly follow Professor Asa Gray in his belief 'that variations have been led along certain beneficent lines as a stream is led along useful lines of irrigation.'"*

These denials of design in nature were welcomed by atheists. The effect of the arguments of Mr. Darwin on

* Cited by Hodge in *What is Darwinism*, p. 86.

that class of minds is well described by Dr. Huxley (*Lay Sermons*, p. 301, 303): "That which struck the present writer most forcibly on his first perusal of *The Origin of Species* was the conviction that teleology, the doctrine of final causes, as commonly understood, had received its death-blow at Mr. Darwin's hands. For the notion that every organism has been created as it is, and launched straight at a purpose, Mr. Darwin substitutes the conception of something which may fairly be termed a method of trial and error. Organisms vary incessantly. Of these variations the few meet with surrounding conditions which suit them, and thrive; the many are unsuited, and become extinguished. According to teleology, each organism is like a rifle-bullet fired straight at a mark; according to Darwin, organisms are like grape shot, of which one hits something, and the rest fall wide. . . . . Far from imagining that cats exist *in order* to catch mice well, Darwinism supposes that cats exist *because* they catch mice well; mousing being not the *end*, but the *condition* of their existence. . . . . Nothing can be more entirely and absolutely opposed to teleology, as it is commonly understood, than the Darwinian theory."

There can be no doubt, then, of Mr. Darwin's denial of the superintending providence of God over the works which he admits owe their being to the Creator. It is true, he confounds God's permission of man's abuses of his works with partnership in vice; as though his causing the grain to grow were a partnership with the distiller who converts it into whiskey. But none the less does he universally and absolutely deny the providence of God over all his creatures. Professor Vogt's remark is just, that "Darwin's theory turns the Creator—and his occasional intervention in the revolutions of the earth, and in the production of species—without any hesitation, out of doors; inasmuch as it does not leave the smallest room

for the agency of such a Being. The first living germ being granted, out of it the creation develops itself progressively by natural selection, through all the geological periods of our planet, by the simple law of descent. No new species arises by creation, and none perishes by divine annihilation. . . . . Thus man is not a special creation, produced in a different way and distinct from other animals, endowed with an individual soul, and animated by the breath of God; on the contrary, man is only the highest product of the progressive evolution of animal life, springing from the group of apes next below him."* There can be no doubt that Darwinism abolishes the belief in God's providence over man and animals.

This Darwinian theory is presented to us as the substitute for the Divine development doctrine—that of the kingdom of God taught by our Lord Jesus Christ; which represents creation as God's great object-lesson to angels and men; beginning with the lowest forms of animal life in four distinct plans of structure, each advancing in one general method to higher forms. Thus the fins of a fish, the paddles of a whale, the wing of a bird, the leg and foot of a horse, the paw of a dog, the arms and hands of a monkey, and the human arm and hand are all constructed upon a similar plan; and each fitted for the use to which its owner would put it, because God formed the original plan and guided all these structures. The gradual introduction of successively higher forms of living beings is satisfactorily accounted for by the educational object God had in view in creation. The evidence of design in these organs is as plain as that of design in the paddles of a steamboat, or in the engines of a locomotive; and the amount of evidence is as many millions of times greater as locomotive animals are more numerous than locomotive engines. The unity of plan in beings so

*_Variations of Animals_, II., p. 415.

diverse as a fish, a bird, and a man, is conclusive proof of their creation by one intelligent Creator.

Our Lord Jesus Christ assumed this divine development theory as the basis of his preaching of the kingdom of God.—asserting that God continues to care for the works of his own hands, and to provide for them; and that even a sparrow does not fall to the ground without our Father in heaven. Man, the child of our Father in heaven, is not forgotten by his Father. Our Lord says, "Behold the fowls of the air, which sow not nor reap, nor gather into barns; yet your heavenly Father feedeth them. Are ye not much better than they?" All the miracles wrought by our Lord were so many contradictions of the Darwinian dogma. His resurrection, ascension, and government of the world, and the fulfillment of his predictions of the conquest of the world by Christianity, are all high as the heavens are above the earth, above the grovelling range of Darwinism. And the second coming of the Lord in the clouds of heaven to raise the dead and establish his everlasting kingdom of life, and love, and peace, and righteousness, is the supreme contradiction to the climax of bathos with which Mr. Darwin concludes his book: "Thus from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, *namely, the production of the higher animals*, necessarily follows." *

It is a very unhappy introduction of Darwinism to the world, that its author should so prominently present it as the antagonist of the deepest convictions of all believers in the providence of God, including Heathen, and Hebrews, and Mohammedans, and Christians. For in the estimation of all these classes the evidence for the kingdom of God is much more conclusive than that for any scientific fact or theory. Were an inventor of a new

*Origin of Species, p. 429.

theory to assure us that it was diametrically opposed to the doctrine of gravitation, as generally understood, we could not help regarding the new discovery with suspicion. And so, when Mr. Darwin takes pains to show us that his theory is diametrically opposite to our belief that the contrivance of our eyes to see with was the result of "means superior to, though analogous with, human reason"—that is, the divine reason—we cannot help being prejudiced against such a theory. A great array of facts and arguments would be necessary to convince us of its truth; some such array as would be necessary to overturn our faith in the law of gravitation. But when we come to examine the facts and arguments adduced in support of Darwinism, we fail to find any such invincible evidence.

I. *Darwinism is only another Theory of Ignorance and Presumption.*

In proceeding to examine the theory from the scientific side, we are astonished to observe that its author presents it to us with abundance of confessions of great ignorance of the most fundamental facts, and of the forces assumed as the working powers of his system. One might suppose that the fate of his predecessors in leading the blind populace would have warned him against attempting to teach what he did not know, and which he knew that he did not know, and of which he actually again and again confesses himself ignorant. But far from any fears of sinking, he gaily leaps on the quagmire, and with an "it is possible," followed by a "we cannot doubt," he goes on, hop, step and jump, to the most wonderful conclusions. His theory is that of the evolution of all plants and animals from a few primeval forms, in the beginning of the geologic ages. But he acknowledges that no specimens of these primeval germs have been preserved, and mourns the impossibility of our ever becoming

acquainted with them! He knows nothing of their size, their shape, their organs, or their functions. But without such knowledge how can he pretend to describe their evolution into existing animals?

Heredity is one of the great powers of his plan of evolution—the Magna Charta of its rights. But he owns himself ignorant of its origin, and of the laws of inheritance. The correlation of the parts of all structures is the prime condition of their existence; and he says he knows little or nothing about it. The great business of his grand agent, natural selection, is the extinction of weak species; but he cannot tell any reasons for the butchery. An immense duration is absolutely indispensible for his slow processes; but he cannot tell what length of a lease he has to run, nor even how long he has been in business already. The variations of plants and animals are the first movers of his method, but he cannot tell the laws governing them; he says they are "what in our ignorance we term spontaneous variations." He has no information about the date of the beginning of the primordial forms, nor of their rate of progress. He alleges that many millions of forms intermediate between existing species must have existed in the past; but cannot tell where to find them, unless under the bottom of the ocean.*

Now all these are facts or principles absolutely necessary to be known before any such theory can be constructed. Mr. Darwin's confessed ignorance of the first principles of his own science, forbids other people's acceptance of it as a scientific exposition of nature. It is necessary to say this in the beginning, since so many young people have been lectured, and magazined, and popular-sciened into the notion that Darwinism is science. But

*_Origin of Species_, pp. 4, 10, 127-9, 97, 100, 409, 410, 415, 423; _Descent of Man_, I., pp. 182, 204, and II., 15. 257.

the greatest part of it is only superstition founded on ignorance—confessed ignorance.

These confessions of ignorance run all through Mr. Darwin's books. When he meets facts which flatly contradict his doctrines of the slow growth of variations, or of inheritance, or of the imperfection of early organs—such facts as the short-legged sheep, the sterility of hybrids, the existence of neuter bees and their instincts, the battery of the electric eel, the eye of the cuttle-fish, and many others of a like kind, of which he can give no explanation, he takes refuge in confessions of ignorance, with all the complacency of a hunted ostrich hiding its head in a bush. According to his theory Mr. Darwin ought to have inherited a tail from his arborean ancestor, but for the life of him he cannot tell what has become of it. The origin of species by variations is the very theory he sets out to prove and illustrate. The very title of his book is *The Origin of Species by Natural Selection*, and yet he unhesitatingly acknowledges that "*Our ignorance of the laws of variation is profound!*" *

On the authority, then, of Mr. Darwin himself, we unhesitatingly receive his theory as one illuminated by profound ignorance of the subject—a game of blind-man's-buff—the blind proposing to lead the blind. Is that science? Belief of any theory devised by such acknowledged ignorance is the basest superstition.

This confessed ignorance of facts and principles, far from producing modesty and patience in building the theory, is followed up shamelessly by the most intolerable presumption in assuming facts which never had an existence, and in asserting doubtful principles without the shadow of proof. Then he refers to these unfounded facts and assumptions as bases of argument, as though they had been established irrefutably like the propositions

* *Descent of Man*, I., pp. 144, 187, 197.

in Euclid. Allow me to cite some remarks which I have made on this part of the subject in another book (*The Fables of Infidelity*, p. 65): "It is evident, however, that evolutionists are not confident of the ability of the facts which they are able to allege to sustain their theory, since they are perpetually postulating assumptions necessary to their argument, but which are utterly unproved, and incapable of proof. Mr. Darwin is the most notorious offender against inductive science in this respect. I have now before me a list of eighty-six assumptions of this sort in *The Origin of Species* alone. Those in his other works are too numerous to mention. He continually mistakes his own assertions, or even his own mere conjectures, for proof; and refers back to them, and builds further assumptions upon them accordingly; and he assumes facts unproven, and incapable of proof; and principles which he must know are denied by his opponents. We can only take a few instances at random.

"He assumes that all dogs are developed from wolves (*Descent of Man*, p. 48); that the instincts of animals are developed (p. 38); that language was developed (p. 53); that there is a wider interval between the lamprey and the ape than between the ape and the man, thus begging the question of man's brutality (34); that the savage is the original state of man (63); that parental instincts are the result of natural selection—and this after owning utter ignorance of their origin (77); that the ideas of glory and infamy are the workings of sympathy (82); that moral tastes are produced by heredity (98); that the standard of morality has been rising since the giving of the ten commandments (99); that our ancestors were quadrupeds (116); that there have been thousands of generations of mankind (125). In his *Origin of Species* he assumes that breeds have the characters of species (p. 411); that rudimentary organs are inherited abortions

(424); that there are four or five original progenitors, and distant evidence of only one (425); he assumes descent to prove his geology (428), and perpetual progress toward perfection, in the face of his own facts of retrogression.

Mr. Darwin presents the most preposterous assumptions with such coolness, and apparent unconsciousness of their utter improbability to his hearers, and with such an entire ignoring of the necessity of any farther attestation than his own *ipse dixit*, as to warrant serious suspicions of his sanity. Take, for instance, his bear and whale story (in his First Edition.) Hearne reports having seen, in the Arctic regions, a bear swimming in the water for hours, with his mouth wide open, catching flies; and Mr. Darwin says, "If the supply of flies were constant [where the winter lasts eight months of the year, 40° F. below zero], *he can see no difficulty in the production at length of an animal as monstrous as a whale!*" That gives us a gauge of Mr. Darwin's soundness of judgment. The rest of the theory is modeled on this bear gauge.

He assumes the indefinite addition of small variations to account for such an amazing metamorphosis as that of a bear into a whale, or of a worm into a man, without giving, or even attempting, proof of such a contradiction of all experience. For everybody knows well that there is a limit to the powers of all animals and of all men. You cannot go on indefinitely adding to their work, or subtracting from their food. That has been known since the days of the Greek who diminished the food of his ass one straw each day, but unfortunately, just as he had brought the donkey to the last straw, he died. Then, again, as to the hereditary transmission of profitable variations, that soon reaches its limit. There is no indefinite progress by that agency. The well-bred greyhound may run a mile in three minutes, or the race-horse the same

distance in 2′ 40″; but no one ever saw his descendant run four miles in a minute, or ever expects to see that result from any amount of breeding or heredity. Yet on the outrageous assumption that there is no limit to the accumulation of small variations, Mr. Darwin constructs his whole system.

These specimens of the ignorance and presumption given us by himself, prepare us for a proper examination of the theory originating in such a head. And it is quite necessary for us to know them, and ponder them well, and calculate the amount of faith we are warranted in resting on confessed ignorance and bare-faced presumption. For there has been a sort of craze in the public mind about Mr. Darwin since his death, and his contributions to science have been lauded beyond all moderation, especially by people who knew little or nothing about them. His laborious collection of facts, and his pleasant way of telling them, deserve all commendation, and will keep his name in remembrance. But his ridiculous fancies, and his theory of descent, with modifications by natural selection as the only agency for the production of all the varieties of plants and animals, will be laughed at by the next generation as one of the follies of philosophers.

II. *Darwinism is not Founded on Facts.*

Darwinism is merely a hypothesis. It is not proven. It is not pretended that it has been proved. Its most sanguine friends do not claim more than probability for it. Even Mr. Beecher, with all the ardor of a new convert, does not claim that it has been established, but only that "it looks that way." The leaders of evolution hardly claim so much. Mr. Huxley will hardly allow it the dignity of a theory, but only of a hypothesis, and he enumerates a number of difficulties as yet insuperable, as we shall see hereafter. Even Mr. Darwin himself only con-

tends that species *may* be originated by natural selection, not that they must; though he often illogically founds positive assertions on this supposed possibility. It is important to keep this in mind. We are not dealing now with an established scientific system, like the Copernican system of astronomy, or the laws of definite proportion in chemistry, but rather with a crude hypothesis like that of the alchemists of the middle ages, or that of the phrenologists of the last generation. So that, though great respect is due to the personal character of the late lamented author, as a laborious naturalist and an estimable man, his hypotheses cannot derive any authority from any source save the proofs he brings forward.

1. *No such Fact of Change of Species as he proposes to account for by his Theory, has ever been observed.*

He proposes to explain the conversion of the lower animals into the higher by genetic descent, but no animal was ever thus converted from a lower into a higher species. Evolutionists are obliged to acknowledge that they cannot produce any instance of such a change of species. The variations produced in domestic animals, sometimes alleged as instances, never amount to any change of species; but, on the contrary, intensify the specific character, as is shown by the greater fertility of the varieties when crossed in breeding. The latest evolutionists give them up. Professor Winchell says (*The Doctrine of Evolution*, p. 54): "The great stubborn fact which every form of the theory encounters at the very outset is that, notwithstanding variations, we are ignorant of a single instance of the derivation of one good species from another. The world has been ransacked for an example, and occasionally it has seemed for a time as if an instance had been found of the origination of a genuine species by so-called natural agencies; but we only give utterance to the admissions of all the recent advocates of

derivative theories when we announce that the long-sought *Experimentum crucis* has not been discovered." Thus the theory cannot draw its first breath, but falls still-born to the ground.

Not only is no instance of change of species now observable; we are able to show that for the past four thousand years all the influences of nature, and all the forces of domestication have not been able to change the specific characters or even the external appearance of many of the animals of Egypt in the slightest degree. The Ethiopian has not changed his skin, nor the leopard his spots. The Hebrews depicted on the tombs of Egypt are recognizably the same in their physiognomy as the dry-goods merchants in our cities to-day. The old Pharaohs can be matched for face and figure any day in the streets of Cairo. The camel, the ass, and the Arabian horse, have not been improved in the slightest degree since the days of Job. The carrier-pigeons used by Sesostris to carry the news of his coronation to all the cities of Egypt did not differ by a feather from those used by Arabi Pasha to carry his orders to the surrounding villages. The drawings on the monuments represent the vegetables of Egypt 4,000 years ago as quite similar to those growing there to-day. Any one can see for himself that the leeks, the onions, the wheat, the barley, the millet, the palm, and the dates have remained unchanged. The pictures of the wild animals and birds are equally distinct and recognizable. One sees those of the crocodile, the frog, the crane, the flamingo, the ibis, the ostrich, the owl, the peacock, and the goose, in no way unlike the living birds around him. The animals are equally recognizable. The now famous ancestral ape is depicted in all his hideousness. Pompey's tame lion is exactly like that in the Zoölogical Gardens. The giraffe differs not a hair from those in the circus. The leopard, the gazelle,

the hippopotamus and the wild boar are precisely like their descendants in the desert or the Nile. Even the little dung-beetle, the scarabeus, has not altered a tint of its color or habits for these past 4,000 years.*

Not merely their external appearance, their anatomical structure remains unmodified. Baron Cuvier, after examining many of the mummied sacred bulls, and other animal gods of the ancient Egyptians, affirms that, "After the most attentive and detailed examination, he discovers *not the smallest difference between these animals and those of the same species which we now see*, any more than between human mummies and skeletons of men of the present day."†

But Mr. Darwin alleges that 4,000 years are but a trifle in his chronology; and demands far longer time to work his wonders by natural selection.

Very well, we will give him all the time there is, though not all he wants. The lingula, a little shell-fish, has continued unchanged from the dawn of life till the present day. The trees, and even the veins of the leaves of the trees, are the same now in Scotland that they were millions of years ago. Hugh Miller says (*Testimony of the Rocks*, p. 77): "The oak, the hazel, the birch, the Scotch fir, all lived, I repeat, in what is now Britain, ere the last great depression of the land. The gigantic northern elephant and rhinoceros, extinct for untold ages, forced their way through their tangled branches; and the British tiger and hyæna harbored in their thickets. Cuvier framed an argument for the fixity of species in the fact that birds and beasts of the catacombs were identical in every respect with animals of the same kind that live now. But what, it has been asked, is a brief period of 3000 years compared with the geologic ages? Or how

* See *Egypt in History and Prophecy*, by ROBERT PATTERSON.

† *Theory of the Earth*, p. 123.

could any such argument be founded on a basis so little extended? It is to no such narrow basis that we can refer in the case of these woods. All human history is comprised in the nearer corner of the immense period they measure out, and yet from their first appearance in creation till now they have not altered a single fibre. And such, on this point, is the invariable testimony of palæontological science, testimony so invaluable that no great palæontologist was ever yet an asserter of the Development Hypothesis."

It is then an undoubted fact, that no instance of transmutation of species can be produced; but, on the contrary, we can show that species remain stable through all accessible geological ages.

Mr. Herbert Spencer endeavors to offset this by alleging that no instance of creation has ever been observed. Were that the case it would only show the weakness of the theory of creation, but it would give no strength to evolution. Two noughts only make nothing. But we allege, on the contrary, a well attested record of creation; and we point, in confirmation of the record, to the facts of the existence and adaptations of all plants and animals, which can only be satisfactorily accounted for by the agency of an intelligent Creator.

It is replied, however, that we have an example of evolution in the birth and development of every living creature, including man, from a mere cell to the full perfection of all its members; and it is asked, "Why should it be more improbable that the species was born and developed, than the individuals composing it?"

But the analogy will not hold. It is defective in several ways. The individual is an actual aggregation of parts for the benefit of the whole; but the species is an ideal archetype for the benefit of each of the individuals. Therefore analogy will not sustain a conclusion contrary

to fact in this case. Moreover the variations of the individual in its evolution from the cell to the full-grown adult are not accidental, but always on one plan in each species, from which plan there is no departure; and they are never indefinite, and so cannot be taken as instances of Mr. Darwin's accidental and indefinite variations. There is no more change of species in the growth of the unborn babe, than in its future progress from infancy to manhood. And finally, the species, being only an assemblage of common characters, and not an organism, cannot give birth to a species, otherwise than through the individuals composing it. Therefore we must fall back on the facts of the birth of individual animals; and we have seen that no instance has ever been found among them of a change of specific characters. No cow has ever brought forth a foal; no cat has ever had a litter of puppies; no sow has ever produced lambs. We have read of the goose that laid the golden eggs, but we have never read of a goose that laid turkey-eggs. The stubborn facts will not down for any analogies.

We assert that the want of any instance of the change of specific character of any animal, is fatal to the theory of Mr. Darwin.

2. *The Multitude of Intermediate Forms between Existing Species, demanded by the Theory, do not now Exist, nor did they ever Exist.*

The theory demands that between every two distinct species of animals there should be many thousands of forms each slightly different from the next, since it is only by such insensible variations any species has attained its distinctive character. Evolution is now going forward, as Mr. Darwin abundantly illustrates; and so should be now producing the intermediate forms in preparation for improved species. The result ought to be, that the world would be full of plants and animals belong-

ing to no definite species. When a farmer brings his wagon load of slaughtered animals to town, the packer ought to have the greatest difficulty in determining which to cure for pork, and which to pack for beef, and which to smoke for mutton hams. Between every distinctly defined hog and ox there should be ten thousand mongrels. The grain inspector should have infinite difficulty, not in grading his wheat as No. 1, or No. 2, but in deciding whether the grain was wheat, or barley, or corn. Indeed nobody should be able, on going to market, to tell which was fish, and which was flesh, or which was good red herring. But the fact, on the contrary, is, that any housekeeper can tell a herring from a salmon, or a chicken from a pigeon, without any advice from Mr. Darwin.

This fact, then, of the present universal existence of distinct species, and of their distinct classification, is fatal to Mr. Darwin's theory.

Mr. Darwin endeavors to evade the force of this undeniable fact by alleging that the missing links are buried in the geologic strata. He says (*Origin of Species*, p. 138): "Lastly, looking not at any one time, but to all time, if my theory be true, numberless intermediate varieties linking closely together all the species of the same group must assuredly have existed; but the very process of natural selection constantly tends, as has been so often remarked, to exterminate the parent forms, and the intermediate links. Consequently, evidence of their former existence could be found only among fossil remains; which are preserved, we shall attempt to show in a future chapter, in an extremely imperfect and intermittent record."

The fact is, he cannot find his missing links down in the rocks, and he abuses them for losing these missing intermediates. Half a dozen times he berates the imperfection of the geologic record. But we shall see presently that it is too perfect by half for his purpose. But in the

meantime, let us note that for every pair of distinct geologic species in our cabinets, we should have about twenty thousand intermediate forms; and that these missing links are conspicuous by their absence.

In confirmation of this statement it will be sufficient to cite a few sentences from the acknowledged leader of European geologists, M. Joachim Barraude (cited by Prof. Winchell in *The Doctrine of Evolution*, pp. 139, 140): "Eleven family types are known in the primordial fauna. These are as trenchantly differentiated from each other as the same types in any succeeding age, or even in the actual fauna. For example, among crustaceans we have trilobites, phyllopods, and astracods. But between a trilobite like *paradoxus*, somewhat lobster-like, and an astracod like *primitis*, a little bivalve crustacean, the difference of conformation is so marked that, were we to refer them to any common ancestry, we should necessarily conceive of a multitude of intermediate forms which must have existed before *paradoxides* and the astracods co-existing in the primordial fauna. Such intermediate forms have left no trace of themselves, either in the rocks which enclose the primordial fauna, or in those which represent the anterior ages. Similar observations apply to the contrasts between any two of the family types of the primordial. It may also be observed that such observations apply to the family types of all the palæozoic ages. *The forms intermediate between them are universally wanting.* One cannot conceive why, in all rocks whatever, and in all countries upon the two continents, all relics of the intermediate types should have vanished.

"This disappearance of intermediate types is so general and so constant in the series of geologic ages, and over the entire surface of the explored formations, that it seems impossible to explain it except by regarding it as the effect of a grand law of nature.

"The absence of intermediate forms characterizes the gaps between genera and even species, as well as between orders and families."

This is decisive. Geology knows nothing of the missing intermediate forms. But had they ever existed, she would have preserved them as faithfully as the specific fossils she has kept safely so faithfully and so long. The conclusion is irresistible, that the multitude of intermediate forms, invented by Mr. Darwin, never had any existence save in his own brain. They are only ghosts seen in his mind's eye. But as they are vital to his theory, with their disappearance his theory melts into such stuff as dreams are made of.

3. *The Possibility of the Existence of such Multitudes of Mongrels is Prohibited by the Sterility of Hybrids.*

The fact is very well known that animals of different species will not breed together. Wild animals of different species manifest a decided repugnance to each other. When under domestication man succeeds in overcoming this repugnance, the offspring are sterile among themselves, though they will breed back to the pure blood. So much modification of any species as can be effected by this, or by any means, can be effected in a short time; and thereafter the variations revert to the normal type.*

So universally admitted is the fact of the sterility of hybrids of different species, that the evolutionists have labored diligently to find some case of such sterility between different varieties produced from the same species by selective breeding. Since, according to the theory, varieties are only incipient species, this should be quite practicable and even common.

But no such case can be found. Prof. Huxley admits the fact, with a full apprehension of its damaging effect on Darwinism: "I do not know that there is a single fact which

* *Lyell, Principles of Geology*, 8th ed., p. 573 *et seq.*

would justify any one in saying that any degree of sterility has been observed between breeds absolutely known to have been produced by selective breeding from a common stock. . . . . If it could be demonstrated that it is impossible to breed selectively from any stock a form which shall not breed from another produced from the same stock, and if we were shown that this must be the necessary and inevitable result of all experiments, I hold that Mr. Darwin's hypothesis would be utterly shattered."*

I have cited this last sentence for the purpose of exhibiting the utter apostasy of this school of scientists from the first principles of the Baconian inductive science; instead of basing their theory upon known facts, they place it in opposition to all the known facts of the world's history, and demand that we prove its impossibility! Do you call that science?

III. *The Geological Record of Life on our Earth in Former Times, Contradicts Darwinism.*

We have seen that the present state of the world offers a complete contradiction to the theory. But here, as in the case of spontaneous generation, there is a tendency to imagine that though species may be stable now, having, as it were, set and hardened in the mould, they were more plastic in the early and formative period of the world's young life. It is therefore important to turn to the record of the stone book, and learn what it teaches about the early introduction of life upon the earth. And, happily, the record, though not perfect, is quite full and quite legible. Though some leaves are wanting, the record on those preserved is very plain; and the illustrations are abundant, amounting to many hundreds of thousands, not of wood engravings of the objects, but the actual fossils themselves, some of which are to be seen in any geological cabinet. Let us then ask what the

* *On the Origin of Species*, p. 14.

geological record says about the derivation of species from lower forms by imperceptible, gradual, and slow variations. And the answer given by the best geologists is, that

1. *There has not been Time, during all this immense duration, for the Slow and Gradual Evolution of Widely Diversified Geological Specimens from a Few Common, Simple Ancestors.*

While geology only presented a few scores of specimens in her cabinets, it was possible to suppose these might have been, in some way or other, developed from each other in some calculable period. But since her discoverers have accumulated many thousands of species, and these so widely differing from each other in size and shape and function and habitation, as the mammoth and the oyster, it has become almost self-evident to all geologists that at Mr. Darwin's rate of development, ten times, or a hundred times the actual duration of the earth would not be sufficient for the development of the oyster into the mammoth; not counting the antecedent period needed for developing the moneron into the oyster. And this is a fatal objection. It kills Darwinism before its birth, as an abortion which could never have had a natural existence.

The subject is beyond the range of ordinary readers, who must accept the conclusions of savans as their only source of knowledge of such a subject; therefore I simply cite the testimony of a leading evolutionist.

Professor Mivart thus summarizes the objection and argument: "Sir William Thompson has lately (*Transactions of the Geological Society of Glasgow*, Vol. III.) advanced arguments from three distinct lines of inquiry, and agreeing in one approximate result. The three lines of inquiry were: 1. The action of tides upon the earth's rotation; 2. The probable length of time during which the sun has illuminated our planet; 3. The tempera-

ture of the interior of the earth. The result arrived at by these investigations is a conclusion that the existing state of things in the earth, life on the earth, all geological history showing continuity of life, must be limited within some such period of past time as *one hundred millions of years.*

"The first question which suggests itself, supposing Sir W. Thompson's views to be correct, is, Is this period anything like enough for the evolution of all organic forms by 'natural selection'? The second is, Is this period anything like enough for the deposition of the strata which must have been deposited if all organic forms have been evolved by *minute* steps according to the Darwinian theory?"*

He answers both questions emphatically in the negative, and proceeds to support his denial by ample reasons, showing that 2,500,000,000 of years would not be sufficient. But the world has existed no such length of time.

But geology supplies positive as well as negative testimony against Darwinism. It demonstrates that

2. *The Order in which Living Beings Appeared on our Earth is not at all that Demanded by the Theory, but often the Reverse.*

Geology reveals to us the order of succession of the appearance of the different classes and genera and species of such living beings on our globe whose remains were capable of preservation. We see from it that the simple forms were first created, shell-fish, fishes, birds, animals, and last of all man. But while this is the general order, when we look at the particular species and genera, we find them, not only not in agreement with the theory of slow, regular, gradual improvement, but frequently in direct opposition to it in important lines of facts. (i.) Species ought to come in *gradually*, whereas their actual appear-

* *Genesis of Species*, pp. 150 et seq.

ance is sudden. (ii.) The lower classes and orders and genera *should always precede* the higher, whereas in many cases the higher classes come first. (iii.) *The largest insects, birds, reptiles, and animals* ought to have grown from the smaller, and should have been preceded by them; but the contrary is the fact; *the largest came first.* (iv.) The theory demands a complete gradation of all the actual species from the lowest to the highest in each locality, as well as of all the intermediate species or connecting links between species; but *there is no such gradation nor continuous series.*

(i.) *The Various Orders and Genera should Come in Gradually and Slowly — on the Contrary, they Appear Suddenly*

The theory is one essentially of slow, of very slow, progress. That is its very condition of success. But Mr. Darwin could not deny that new families, and new genera, and new species, do not generally appear gradually and slowly, but suddenly and in great numbers. And what aggravates the difficulty, these great changes in the forms of life appear almost simultaneously in the most distant places. He tells us that "Scarcely any palæontological discovery is more striking than the fact that the forms of life change almost simultaneously throughout the world."*

On his theory it should not be so. The chances that the numberless millions of individuals of any given species, say mussels, should begin to vary towards the same higher form simultaneously are so enormously, I might say so infinitely, against such an accident—for it is only that in this theory—that they amount to a moral certainty. But this sudden appearance of new species has happened not once only, but half a dozen times. It is explicable only, however, as the result of God's creating new races all over the earth at once.

* *Origin of Species*, p. 297.

M. Barraude, in the work already cited, p. 141, after noticing the fact that no trilobites are found below the Silurian rocks, though remains of plants and marine worms are preserved there, and that the trilobites appear at once in great abundance, thus comments upon its bearing upon Darwinism: "All these sudden manifestations of life under new typical forms, appearing constantly and everywhere with the plenitude of their distinctive characters, are in complete discordance with the hypothesis of a gradual development by insensible and successive variations, since such a transformation can only be wrought out through an indefinite series of intermediate forms, of which no trace has been found in any country."

(ii.) *The Lower Orders should Appear First, but Frequently the Higher Orders Precede them.*

The theory is devised expressly to account for the derivation of the higher animals from the lower. Of course the lower orders, being the parents, should come into being before their children. But in many regions the contrary rule prevails, and the higher orders come into being first—the children, as Mr. Darwin will have them, are born before their parents. The four-gilled cephalopods are found in the Silurian strata, but the two-gilled, their Darwinian ancestors, are not found below the lias. They are many thousands of years younger than their children !* Prof. Mivart goes on to notice another instance with the following remarks (*Genesis* p. 123): "If we admit the hypothesis of gradual and minute modifications, the succession of organisms on this planet must have been a progress from the more general to the more special, and no doubt this has been the case in the majority of instances. Yet it cannot be denied that some of the most recently formed fossils show a structure singularly more generalized than any exhibited by older forms;

* Mivart, *Genesis*, p. 89.

while others are more specialized than are any allied creatures of the existing creation."

He proceeds to illustrate these remarks by describing the existing armadillo as nearly allied to the extinct glyptodon; the macruchenia, a hoofed animal, only recently extinct, as more generalized than any known structure, uniting in itself the characters of both odd and even-toed hoofed animals; and also by the case of the extinct sabre-toothed tiger, "characterized by a more highly differentiated and specially numerous dentition than is shown by any predaceous beast of the present day."

But the most satisfactory and comprehensive illustration of this subject is found in the exhaustive work of M. Barraude on *The Silurian System of Bohemia*, already cited, with its maps and tables. Having examined that system from Spain to Bohemia, he gives a diagram showing the percentage of the simpler forms which might be expected to precede those more highly developed, and he contrasts it with the actual numbers of species found. The contrast between the theory and the fact is obvious and startling. Of trilobites, for instance, 108 species are found in the lower strata, where, according to the theory, none at all should appear. Then of sponges there are only two species, where the theory requires 100; while of the polyps and foraminifera, which should be as numerous, there are none at all!

One should read the whole of this work to appreciate the force of this general conclusion. It abounds with such observations as this (found on p. 130): "When we thus consider that the relative development of trilobites and mollusks underwent a gradual diminution to *give place to lower forms*, we recognize the fact that it presents an order, diametrically opposed to that which ought to be observed according to the theories." He shows that the foraminiferæ, the next in structure above the *eozoon*, being free

from the terrible "struggle for existence," since they would have had the world to themselves according to the theory, should have been numerous in the Cambrian system beyond all parallel; whereas they do not appear at all. "Thus the foraminiferæ, the immediate descendants of *eozoon* by filiation and transformation, ought to have propagated themselves under all imaginable forms during the ante-primordial era." Whereas they do not appear till the mesozoic era, many millions of years later, and successfully keep the field in the tertiary and the quaternary periods against higher forms of life. Many other equally rebellious families lift up their heels against Mr. Darwin's theory.

Space forbids the citation of many other such testimonies. I add only another from an American geologist, Principal Dawson, of McGill University, Montreal. Commenting on Dr. Bigsby's table of the primordial fauna, representing 972 species, he says: "Further, we observe that while some forms, like lingula and nautilus, have persisted down to modern times, others, like the trilobites and orthids, perished very early. In all this we can dimly perceive a fitness of living things to physical conditions, a tendency to utilize each type to the limit of its capacities for modification, and then to abandon it for something higher; a tendency of low types to appear first, *but to appear in their highest perfection and variety;* a sudden apparition of totally diverse plans of structure subserving similar ends, simultaneously with each other—as for instance, those of the mollusk and the crustacean; the appearance of optical and mechanical contrivances, as for example, of the compound eyes of the trilobite, and the swimming-float of the orthocerin, all in their perfection at first, just as they continue to this day in creatures of similar grade. That these, and other similar things, present a uniform and far-reaching plan, no rational mind

can doubt."* They deny natural selection, and declare creation.

(iii.) *The Larger Insects, Reptiles, and Animals should have Followed the Smaller; but on the Contrary, they often Precede them.*

The primeval moneron was only the size of a pin-head. So evolutionists tell us. From this little fellow came a son a little larger. The grandson increased his size a little. And thus, very gradually, some of his posterity grew wealthy and bulky, and became mammoths. This order must have been always observed, since natural selection will not allow any leaps. But when we look at the actual order of nature, instead of finding ourselves in a steady farming community, where careful farmers lay up small savings, and accumulate perhaps a thousand dollars in a lifetime, we seem to have landed in California during the placer mining days of 1849, when men who began life with only a shovel and a pickaxe and a tin washing-pan, washed out hundreds every day, became millionaires in seven years, and sold out and left their exhausted diggings to less lucky speculators. We find among all classes of creatures in the olden times, that the first were the largest; and that succeeding species dwindled in size.

The crustaceans adopted the policy of putting their best foot foremost. Trilobites two feet long, and of from twelve to twenty segments, appeared before those of six or nine. The pteregatus ricylinus, a lobster-like crustacean, could have sent specimens six feet long and two feet broad to the London market, some millions of years ago. Take for example the Mount Diablo oyster shells, fifteen inches long. Can our Fish Commissioners now match either these old-fashioned oysters or lobsters, with all our modern progress? That old lobster would have made protoplasm of them had they incautiously tried any

* *The Earth and Man*, p. 51.

experiments with him. Its antennæ were armed with powerful claws. It had four pairs of great serrated jaws, the largest as large as a man's hand. It was wide awake too, having ten eyes on the top of its head, and ten below. It had also two great paddles at its side, and a great flat tail, and could reverse engines, and dart backwards on its prey. We cannot match it now-a-days.* The plants were gigantic in those early days. Our modern mare's-tails are about the thickness of one's finger; those of the coal measures are as thick as a flour barrel.

But the reptiles of the old world are by far the most astonishing and terrible for size. The labyrinthodon, a newt, had teeth three or four inches in length. The ancient iguanodon was a gigantic biped deinosaur, twenty feet or more in height, with legs like those of an ostrich, but thick as those of an elephant, and an immense tail on which it rested, making a tripod with its legs. (Dawson, p. 203.) The megalosaurus was as large, but far more swift and terrible. The celosaurus had a thigh bone sixty-four inches long, and thick in proportion; it stood ten feet high, was fifty feet long, and must have weighed as much as a dozen modern crocodiles. The bats of the mesozoic age were as large as eagles, and one specimen was twenty feet in the spread of its wings (p. 206). The plesiosaurs were fifty feet long, with long necks like cranes for gobbling up their prey from the shallow waters. The pliosaur had a head eight feet long, armed with conical teeth a foot in length. It had four paddles, each seven feet in length. The sea-serpent has been found by geologists, in St. Peter's Mount, near Maestrecht, with a skull three feet long, and a body not less than eighty feet! No modern sea-serpent can equal that! After describing its terrible armament, Mr. Dawson very

* See Dawson's *Earth and Man*, p. 94; Winchell's *Evolution*, pp. 64, 68, 131, 136, 156 *et seq.*

fitly observes: "Perhaps no creatures more fully realize, in their enormous length and terrible powers, the great *tanninim* (the stretched-out or extended reptiles) of the fifth day of the Mosaic record" (p. 217). Of another, a land animal, the dinotherium, he says: "The skull was three feet four inches in length, and when provided with its soft parts, including a snout or trunk, it must have been at least five or six feet long. Such a head, if it belonged to a quadruped of ordinary proportions, must represent an animal as large in proportion to an elephant as an elephant to an ox" (p. 251). He describes a tortoise with a shell twelve feet long, and this huge roof must have covered an animal eighteen feet long and seven feet high. Of an ancient four-horned antelope, or deer, the livatherium, he says: "It is supposed to have been of elephantine size, and of great power and swiftness" (p. 254). But why refer to books? You can see the resurrected mammoth in the various museums, as much larger than the circus elephant as the elephant is larger than a cart-horse. This gigantic beast plants his foot squarely on the breast of Darwin's doctrine and squashes it into the mire forever.

(iv.) *The Gaps in the Gradation are Fatal to the Theory.*

The theory assumes an *unbroken genealogical succession.* Any break in the line is fatal, for Mr. Darwin rigidly excludes creation. And this unbroken succession must be an unbroken, regular gradation; there must be no advancing by fits and starts, no gaps or breaks; no leaps from low to high forms—all must be gradual and regular.

But when we look at the geological record we see that it is full of breaks, and the gradation is very incomplete; and the progress quite different from what the theory expects. Answering the objection, that the missing links

may be buried in the breaks of the strata, Professor Agassiz replies: "However long and frequent the breaks in the geological series may be in which they would bury their transition types, there are many points in the succession where the connection is perfectly distinct and unbroken; and it is just at these points that new organic groups are introduced *without any intermediate forms to link them with the preceding ones.*"*

There are four great gaps in the gradation between man and matter: First, that between dead and living matter. This Mr. Darwin bridges over by owning the Creator. Second, the gap between the vegetable and the animal. This he also bridges by owning the creation of separate types for each kingdom. Third, that between any species of organism and any other. This Mr. Darwin undertook to bridge by his theory. But as his bridge timbers are very short, the chasm must be narrowed to a very short gap. But when the great geological convulsions came, sweeping away scores of species and families, and beginning the world's life with new and often totally different species, Mr. Darwin's theory is unable to leap such gaps. There are at least four of such geological chasms, impassable by the theory. Fourth, the greatest gap of all is between the unreasoning animal and the intellectual and moral nature of man. Some futile attempts have been made to find the missing link between man's body and that of the apes; but no one has seriously proposed to bridge the chasm between the mere animal and the reasonable soul of man. Even Professor Tyndall acknowledges that "here yawns an immense gap which it is impossible to bridge over." These gaps break the chain. They are fatal to the theory of genealogical succession.

Summing up the whole bearing of the fossils of the

* *Methods of Study*, p. 5.

Silurian system upon the Darwinian theory, M. Barraude declares: "We have now established as the direct result of our studies, that direct observation contradicts radically all previsions of palæontological theories on the subject of the composition of the first phases of the primordial fauna of the Silurian.

"In fact, the special study of each of the zoölogical elements which constitute these phases has demonstrated to us that the theoretic previsions *are in complete discordance with the facts* observed by palæontology.

"These discordances are so numerous, and so pronounced, that the composition of the real fauna *seems to have been calculated by design for contradicting everything which the theories teach us respecting the first appearance and primitive evolution of the forms of animal life upon the earth.*" Undoubtedly God so designed it.

Such is the verdict given upon the geological evidence of Darwinism by the greatest living geologist in Europe. It is fatal. The great past to which Mr. Darwin appeals casts his theory from its waters, a broken wreck, upon the shore of time.

IV. *Natural Selection is an Utter Failure.*

This is the very heart and life of Darwinism. Natural selection is Mr. Darwin's deity; his substitute for Providence; his one, only, all-sufficient force for the elevation of the snail to the dignity of manhood. In his estimation it rests upon self-evident facts. The mere statement of three or four propositions about the variability of individuals, the struggle for existence, and the survival of the fittest, ought to convince everybody that natural selection is omnipotent. But he devotes his book to the illustration and defense of these propositions in condescension to the ignorance and prejudice of mankind. If he fails in establishing natural selection, his whole theory must fall with the foundation. Now I propose to prove

that natural selection is a failure. It is lame in both legs —the right leg is variation; the left, the struggle for existence. There is no such indefinite variability of animals as Mr. Darwin demands and asserts; and if there were, no such accidental variations as he describes could ever produce the multitude of the contrivances of nature coordinated to the common good. Nor can the struggle for existence ever elevate any race. It is always a degrading agency. Yet Mr. Darwin employs this leaden-winged diver to raise all creation up to the highest heaven he can conceive—their elevation to the rank of the higher animals.

The notion of a sufficient number of accidental small profitable variations happening in the same place to successive generations of animals, all in the same direction, for the production of even an improved breed, to say nothing about such a work as the construction of an eye, is too improbable for belief. It involves such a number of improbabilities that we cannot attempt to enumerate them all. We can only glance at some of the greatest. Any one of these is enough to render the theory unworthy of belief; but the credulity which can swallow them all need not hesitate at any other superstition.

1. *Natural Selection is not a Productive Force; it cannot Create, but only Preserve, and therefore cannot Populate the World.*

By the very terms of his definition Mr. Darwin excludes natural selection from *originating* anything, even the most minute feather or hair, or the tint of a shade of color. All variations must be made ready to its hand, and then, but not till then, it can select the best. This dignified neutrality is quite inconsistent with the language repeatedly used by Mr. Darwin, ascribing to it active force, and with the whole tenor of his book, which ascribes to it the elevation of all the higher animals from

their original germs. But let it be borne in mind that the real active force in his theory is, *accidental variation.* And the question for us to decide is, whether accidental variation is a force endowed with power and wisdom enough to elevate a squid into a whale, a butterfly into a buffalo, or a monkey into a man.

2. *Natural Selection cannot Account for Organs Made or Strengthened in Opposition to the Physical Force of the Animal.*

Lamarck's favorite and popular giraffe is a striking illustration of the principle. The neck and tongue were lengthened, on Mr. Darwin's theory, because thereby the longest-necked browsed best, grew heaviest, and so survived. But every pound added to its weight, pressed upon the legs of the young giraffe, yet soft, and pressed them down to the earth. If, then, there had been no superior force at work, the law of gravitation should have shortened the legs as the weight of the body increased. But, on the contrary, we see a regular and studied proportion between the elongated neck and the elongated legs of the giraffe. This must have been produced by a power working in direct antagonism to the physical forces, and so in antagonism to Mr. Darwin's natural selection, which abjures every supernatural force.

3. *Natural Selection cannot Produce any but Profitable Variations; but many Variations are actually Injurious to their Owners.*

Mr. Darwin repeatedly asserts, and his theory is founded upon the assumption, that only such variations as are *profitable to the individual* are preserved and accommodated. Whence, then, have the rattles of the rattlesnake been derived? For these, by giving warning to his prey, and driving it away, are a positive injury to him. Of the same nature is the barb on the sting of the honey bee, which, remaining fixed in the wound, causes the

death of the bee after wounding any tough-skinned animal. And the superior sweetness of the better grasses and grains, which makes them the object of selection by grazing animals to the hindrance of their seeding, could never have been produced by natural selection. Here there are large classes of animals and vegetables excommunicated from Darwin's kingdom

4. *Variations are not Generally Profitable at First, nor until Complete; and therefore, according to the Theory, could not be Preserved.*

Consider, for example, the first formation of limbs. By the hypothesis, the first living creatures had no limbs, neither feet nor fins; and many creatures are still without any. The first beginning of a limb could only have been a little roughening of the skin. Now, how could an infinitesimal roughening of the skin in any way aid such a creature in the struggle of life? But it is only "profitable variations" which are preserved. The first variations towards feet or fins manifestly would not have been profitable, and so could not have been preserved. Then again, the provision for the support of the young of all the mammalia, by sucking the mother's milk, never could have been introduced by small accidental variations. Such would have been utterly useless for the nourishment of the young, which must have perished while the teats and milk glands were growing. This is a fatal objection to the theory, and it is as world-wide and self-evident as any truth can be.

In what way could the transition from water-breathing to air-breathing animals be effected by small accidental variations? Could gills be converted into lungs by any such process? If a fish were cast ashore and half-killed by the drying up of water in its gills, would that be a "profitable variation," likely to be transmitted to its progeny? Yet Mr. Darwin says we all came from aquatic

ancestors. His idea is, that the lungs are developed from the swim-bladder of the fish. But no one has succeeded in rendering such a process probable. The instincts of birds in hatching their young could not possibly have arisen by such slow imperceptible variations. For how could it be profitable either to the bird or to the egg, for her to sit upon it, say five minutes, and then run away and never look near it more. The hatching instinct which confines the mother-bird to the nest till her young are hatched, it is evident, must have been given in its perfection at the very first, else no young bird could ever have been hatched. But the imparting of such a self-denying instinct to the mother-hen for the benefit of the chickens shows the kindly heart of a loving Father of all.

It is impossible to prove that the various tints of the beautiful plumage of the peacock, or the more exquisitely tinted crests of the humming bird, are of any advantage to the wearer. Mr. Darwin has tried to account for them by his theory of sexual selection. But, as the male bird is always stronger than the female, and beauty does not count in a cock-fight, the sexual selection is all the other way. But in the case of full many a shell of rarest tints in the deep unfathomed caves of the ocean, fixed to its rocks, and fertilized by the sperm borne by the insensate waters of the ocean without the contact of any other shell-fish, no such plea can be even imagined. Yet who has not admired the pearly interior of the abelone? or the delicate shadings of the interior of the conch? or the beautiful markings of the tiger shell? Mr. Darwin reasons against the instincts of all men when he denies that these beauties are evidences of a love of beauty for its own sake, and tries to degrade them into mere utilities.

5. *Anticipatory Organs Cannot be Accounted for by Natural Selection.*

We observe many cases in which animals are quickly endowed with organs in advance of their necessity for them, and while their growth is of no present advantage to them. For instance, the tadpole of the frog is a water-breather, and has gills for that purpose. But while it is still swimming about in the water, without the least change in its circumstances, it begins to develop lungs, and to absorb its gills, in opposition to its present necessity, but in anticipation of its future life. But this is a prophetic power widely different from natural selection. Of a similar character is the development of milk in the mother in anticipation of the wants of her young, which plainly declares foresight and plan somewhere. The anticipatory instincts of neuter bees, their storing up food, and feeding the young of the queen bee—actions in no way beneficial to themselves—Mr. Darwin himself is compelled to acknowledge unaccountable on his theory.

6. *The Variations do not Obey Mr. Darwin's Orders. The Improved Types of Animals do not Crowd out the Simpler Forms, as the Theory Requires.*

It is a fundamental postulate of the theory that in the struggle for existence the improved forms should crowd out the unimproved. But on the contrary, the world is full of the simpler forms of life. There are plenty of monkeys as well as men. All snails have not improved up into philosophers. The lingula of the primordial geologic ages has not improved into a man, nor even into a clam; it is no bigger nor better than its forefathers of the days of the pterodactyls. Even Professor Haeckel's primeval moneron still exists in unnumbered millions, no bigger than its first ancestor, no better, nor ever likely to be.

Now all this is in direct contradiction to the theory. It cannot be said that these improved species have not had time, but that they will yet make up their short-comings.

They have had all the time there is; all the time the improved species had, and found it enough to improve into monkeys and to men. What more do they want?

7. *The Variations, both in Domestic Animals and Wild Species, are Frequently Great and Sudden, Contrary to the Theory which Requires them to be Small and Gradual.*

Mr. Darwin's variations must be all very minute, and the progress of change, consequently, very slow, else he could not make his theory seem probable. But many of those variations with which we are acquainted were not at all slow. The otter breed of sheep appeared suddenly. The porcupine family of men in England appeared suddenly. So did the black peacocks. The young oysters transplanted from England to the Mediterranean "at once altered their mode of growth and formed diverging rays like the proper Mediterranean oyster." The greyhounds taken from England to the mountains in Mexico, fell down gasping for breath in the thin air of that altitude, but their whelps of the very first generation were able to run. Mr. Mivart, an evolutionist, remarks on this: "We have here no action of natural selection. It was not that certain puppies happened accidentally to be capable of enduring more rarefied air, and so survived, but the offspring were directly modified by the action of surrounding conditions. Neither was the change elaborated by minute modifications in many successive generations, but appeared at once in the second."*

Mr. Darwin himself very candidly gives us a number of instances of sudden and great variation. One is of a variety of broccoli suddenly appearing, and faithfully transmitting its peculiarities. Every nurseryman could give him many such instances of "sports" breeding true from seed. He tells us that the Amein and Mauchamp

* *Genesis of Species*, p. 113.

sheep, Asiatic cattle, turnspit dogs, frizzled fowls, short-faced tumbler pigeons, hook-billed ducks, and a multitude of vegetable varieties have suddenly appeared in nearly the same state we now see them. In five distinct cases there has been an occasional development of the black-shouldered peacock, on Sir J. Trevelyan's estate, to the extinction of the previously existing breed." *

We have already seen the sudden appearance of many new species and genera, preceded by no simpler relatives, in the geologic age. Now all this is in pronounced contradiction to the Darwinian dogma of changes by slow and minute variations; variations which, as we have already seen, could not at first have been beneficial to the animal or plant. Such variations as we observed were of a magnitude sufficient to be of some use either to the animal or its owner. And thus they exhibit design, and overthrow the notion that all the varieties of the animal and vegetable world are produced solely by small accidental variations. Sudden variations of such magnitude overleap Mr. Darwin's slow and small coaches. Natural selection could not have got her little team hitched up before these variations had run their course and won the race.

8. *Variation does not Act with the Uniformity of a Law of Nature, as Mr. Darwin's Theory Requires.*

Were variation a law of nature it must be invariable, universal, everlasting. No species could be exempt from its influence. But, on the contrary, we find certain families of animals which have not varied a hair's-breadth since the beginning of life on our globe. Amidst all the convulsions accompanying the deposition and the upheaval of the limestones, during all the ages of the carboniferous period, while the gigantic reptiles swam and flew over their heads, and died and gave place to the

* *Animals and Plants under Domestication*, pp. 71, 114, 291; Vol. II., p. 414.

existing animals, the little *lingula*—a small bivalve mollusk, hardly the size of your finger nail, has remained unchanged; differing from all other shells in being hardened, not by carbonate of lime, but by phosphate of lime, like the bones of vertebrates—continues unchanged from the dawn of life till now; "for their shells, as they exist in the primordial, are scarcely distinguishable from members of the genus which still live. While other tribes of animals have run through a great number of different forms, these little creatures remain the same."*

Again, in regard to removal to distant regions, we find the most diverse regions and conditions, and even climates, not powerful enough to change the specific character of plants and trees in any perceptible degree.

Professor Hooker asserts that "Scandinavian genera and even species reappear everywhere from Lapland and Iceland to the tops of the Tasmanian Alps. . . . . They abound in the Alps and Pyrenees; pass on to the Caucasus and Himalaya; thence they extend along the Kasin Mountains, and those of the peninsula of India. He traces them through Java, Borneo, Australia, and Tasmania, to New Zealand and the Antarctic islands, *many of the species remaining unchanged throughout.*" †

Now this identity of specific character under such widely different geographical conditions cannot be explained on any theory of accidental variations producing similar species over so many thousands of miles, and in so many thousands of places. The chances against it are millions to one. Nor can it be explained by migration from some one Scandinavian or Alpine home, unless under the condition of such a constancy and vigor of specific character as resists all external forces which do not actually extinguish life. But that is the direct contradic-

* Dawson's *Earth and Man*, p. 41.

† *Flora of Tasmania;* Introductory Essay.

tion of Mr. Darwin's notion of universal and indefinite variability.

A third inconsistency appears in the production of widely different organs under the same circumstances, and for the same purposes.

Thus the whale and the shark both need to find their food in the water, but the one has lungs, and the other has gills; the one breathes air, the other water. The squirrel and the sparrow both desire access to a fruit tree, but the squirrel has never yet developed a pair of wings. The bird and the butterfly are equally desirous of flying, but can any two structures be more diverse than the wing of an eagle and the wing of a butterfly? Yet according to the theory they both were produced from the same original pin-head of protoplasm. Insects, mollusks, and vertebrate animals all were benefited by being able to see; but there are three distinct and different types of eyes, and in many cases all three produced in the same place and circumstances. The negroes of Sumatra who have trained the ape to climb the trees and pull cocoanuts for them, though according to the theory they must have been as long under the desire for nuts as the monkeys, and in as much need of them, have either never developed prehensile arms and feet, or else must have lost them; either of which suppositions contradicts Darwinism.

Had the tendency to variation been merely a blind force, the result merely of physical law, it would not have behaved so differently under the same conditions. The negro and the monkey would have been equally endowed with prehensile hands and feet. It would not have discriminated *against* its favorites. Had the external circumstances been the controlling fact, the plants and trees of the Scandinavian flora would have been greatly modified by their journey to the Antarctic Islands;

and the little *lingula* must have been greatly altered during the vast changes of the geologic ages since its first appearance. But the permanence of species under such diverse circumstances, and the diversity of species under the same circumstances, attest, not the action of a uniform and invariable law of nature, but the supremacy of a higher and supernatural Power, controlling, guiding, and causing variation for His own ends.

9. *Variation in Individuals is Diluted by Numbers. Multitudes of Individuals must have been Accidentally Modified in the Same Way and at the Same Time and Place, to Produce a Permanent Change of Form; which is Exceedingly Improbable.*

An article in *The North British Review* (for June, 1867, p. 286), shows that a species cannot be changed by the favorable variation of a few individuals in a century, because their slight individual advantage would be overwhelmed by the power of the greater numbers of the unimproved: "A million creatures are born. Ten thousand survive to produce offspring. One of the million has twice as good a chance as any other of surviving. But the chances are fifty to one against the gifted individual's being one of the hundred survivors. . . . . All that can be said is, that in the above example the favored 'sport' would be preserved once in fifty times. Let us consider what will be its influence on the main stock when preserved. It will breed and have a progeny, say of 100; now this progeny will on the whole be intermediate between the average individual and the sport. The odds in favor of one of this generation of the new breed will be, say one and a half to one as compared with the average individual; the odds in their favor will therefore be less than that of their parents; but owing to their greater number the chances are that about one and a half of them would survive. Unless these breed together, a most

improbable event, their progeny would again approach the average individual; there would be 150 of them, and their superiority would be in the ratio of one and a quarter to one—the probability would be now that nearly two of them would survive, and have 200 children with an eighth superiority. Rather more than two of these would survive, but the superiority would again dwindle, until after a few generations it would no longer be observed, and would count for no more in the struggle for life than any of the hundred trifling advantages which occur in the ordinary organs.

"An illustration will bring this conception home. Suppose a white man to have been wrecked on an island inhabited by negroes, and to have established himself in friendly relations with a powerful tribe, whose customs he has learned. Suppose him to possess the physical strength, energy, and ability of a dominant white race, and let the food and climate of the island suit his constitution; grant him every advantage which we can conceive a white to possess over a native; concede that in the struggle for existence his chance of a long life will be much superior to that of the native chiefs; yet from all these admissions there does not follow the conclusion that, after a limited or unlimited number of generations, the inhabitants of the island will be white. Our shipwrecked hero would probably become king; he would kill a great many blacks in the struggle for existence; he would have a great many wives and children. . . . . In the first generation there will be some dozens of intelligent young mulattoes, much superior in average intelligence to the negroes. We might expect the throne to be occupied for some generations by a more or less yellow king; but can any one believe that the whole island will gradually acquire a white or even a yellow population?

"Darwin says that in the struggle for life a grain may

turn the balance in favor of a given structure, which will then be preserved. But one of the weights in the scale of nature is due to the numbers of a given tribe. Let there be 7000 A's and 7000 B's, representing two varieties of a given animal; and let all the B's, in virtue of a slight difference of structure, have the better chance of life by $\frac{1}{7000}$ part. We must allow that there is a slight probability that the descendants of B will supplant the descendants of A. But let there be only 7001 A's against 7000 B's at first, and the chances are more equal; while if there be 7002 A's to start, the odds would be laid on the A's. True, they stand a greater chance of being killed, but then they can better afford to be killed. The grain will only turn the scale, when these are very nicely balanced, and an advantage in numbers counts for weight, even as does an advantage in structure. As the numbers of the favored variety diminish, so must its relative advantages increase, if the chance of its advantages is to surpass the chance of its extinction, until hardly any conceivable advantage would enable the descendants of a single pair to exterminate the descendants of many thousands, if they and their descendants are supposed to breed freely with the inferior variety, and so gradually lose their ascendancy."

Mr. Darwin himself acknowledges that the justice of these remarks cannot be disputed. Thus he surrenders his theory, since there is no probability of the accidental simultaneous similar variations of millions.

10. *The Homology of Structure of so many Individuals, and of whole Generations and Classes, could not have been Produced merely by a Multitude of Small Accidental Variations.*

Mr. Darwin mistakes the difficulty of the problem before the human mind when he devotes himself to the investigation of the origin of *species.* He should have first

explained the origin of *individuals*. How does it happen that one of the vertebrate animals is composed of many similar vertebræ, each joint added on to that before, and hinged also, and the intermediate joints hinged also, each to one behind it? Is that orderly succession the result of some millions of lucky little accidental variations? In the higher vertebrates, there are two limbs behind and two before, and these are placed, not any where indifferently over the body, but one on each side behind, and one on each side before. Does any one persuade himself that this is the result of the thinning out of innumerable millions of centipede beasts with legs on their backs, and legs on their heads, and legs sticking out, or beginning to bud, all over them? and of the accidental preservation of some little fellow at first lucky enough to have only ninety-nine legs; and then that some of his progeny had only ninety-seven; then in a hundred generations or so would come one with only ninety-five; and so, in many millions of years, some beast would be blessed with only nine legs, four reaching the ground, and four addressing the sky, and one projecting from the head. Then, after many millions of years, among these would arise one with only eight legs and a half, who might produce some one with only eight legs and a quarter. And thus after long millenniums breeds would arise of only four legs. But why should all the chances run in the direction of symmetry? The chances against it are millions against one; as many millions as there are possibilities of monstrosity multiplied by the number of vertebrate animals which have ever existed on the earth. No one can contemplate a bird or beast without being impressed with the idea that here is a being composed of a large number of parts, each adapted to the rest, and all combined so as to promote the good of the whole of the being of which they are the parts.

Then again, when our quadruped has got his limbs reduced to four by a multitude of lucky chances, how does it chance that these four are of equal length in so many tribes? and when of unequal length, that the two hinder limbs are equal, as in the kangaroos, and fitted for leaping from, so that the animal can make speedy traveling? Accidental variation clearly did not care a straw about that; and two to one would have put a short leg and a long one behind, and a short leg and a long one before, in the kangaroo. Of the seven hundred and twelve lengths of horses' legs, natural selection has not the least objection to any of them being the length of "Dexter's" right fore leg, and of any other being an inch shorter for his left fore leg, and of another two inches shorter for his right hind leg, nor that his left hind leg should be three inches shorter than his left fore leg. The symmetry of the form of the noble animal cannot be satisfactorily accounted for on any theory of accidental variation.

Anatomists point out to us the homologies of the structure of corresponding parts in animals of the most diverse structures and habits. The hand of man, the fin of the whale, the wing of the bird, the foot of the horse, and the wing of the bat, are apparently exceedingly unlike each other, either in appearance or in the uses made of them; nevertheless they show us that they are all constructed on a common plan, with an equal number of bones, differently lengthened and arranged for the accomplishment of their respective purposes. The evolutionists admit the homology, but explain it by hereditary descent and variation. But the reason of man refuses to shut its eyes to the existence of a common plan in the structure of these different animals, and refuses to ignore the fact of free choice in the selection of the plan of the vertebrate skeleton instead of another type of existence. For that is not the only possible type of structure. The

wing of the butterfly is constructed on a totally different model from that of the humming-bird, though both are flying machines. Homology is not accidental. Our reason refuses to trace it to accidental variations in Waltham watches.

11. *The Accidental Occurrence of Profitable Variations at Long Intervals of Time, could not possibly have produced the Beautiful Adaptations of Nature.*

Mere physical causes cannot produce the long and wonderful harmony of the cosmos, or the adorned world, and the fitting of one part to another, each quite independent of the other in its origin. For instance, the lungs of animals are perfectly adapted to the air they are to breathe, before they are born, and before natural selection has had any opportunity of acting. Is this only one lucky accident out of millions of failures? There is an arrangement of the distance of the earth from the sun, and of its annual and diurnal revolutions, perfectly adapted to promote vegetable and animal life on the earth, and this arrangement must have existed before any living creature appeared upon it, and so before natural selection existed. In a word, *the plan preceded the selection.*

It is impossible to enumerate in this treatise all the adaptations of nature. Let us look for a little only at the series of contrivances displayed in the eye. The eye is perfectly adapted to the light of the sun, which existed long before it. It is an exceedingly complicated optical instrument, if we regard it only as a telescope to look *through*, forgetting for the present its power to see with. The ball of the eye hinged on a universal joint, and moved by six muscles, one of which passes through a pulley, all pulling in various and opposite directions, with forces so nicely balanced that the slightest effort of will turns it in any desired direction, is but the smallest of the multitude

of nice adjustments necessary to its use. Yet by the doctrine of chances—a doctrine recognized by all evolutionists, and used in the very genesis of their theory as to the origin of the motions of the planets—the probabilities against these six muscles being so adjusted by accidental variations, and that the superior oblique muscle should pass through a pulley in the inner portion of the orbital process of the frontal bone, so as to rotate the eye inward and forward, is 279,936 times greater than that your spring weighing-machine was made by the accidental co-operation of a multitude of small favorable variations.

The cornea, or transparent concavo-convex lens which forms the front of the eye, the part which first arrests our notice, is a segment of a smaller sphere than the sclerotic coat, into which it is set as a watch-glass is set into its frame. This change of shape of that part of the eye is necessary to correct vision. The possible changes of curve from that of the sclerotic are more than 1,000, none of which would have been suitable. That the only one out of the thousand adapted to correct vision should happen to be employed by accident is too much for even a child to believe. But when we discover that this transparent cornea is not a glass lens, of one uniform substance, but that it is built up of from six to eight layers of soft fibres, connected by aureolar tissue, and separable by maceration, and penetrated by blood vessels, capable of inflammation, each fibre subject to that disease, and to ulceration, and other diseases of living structures—the chances that not less than 36,000 of such delicate parts should accidentally happen together in such intimate relations, and in such close and harmonious fellowship, are 36,000 multiplied by itself 36,000 times, less than that your watch-crystal grew into its shape, and size, and place by small accidental variations!

The crystalline lens lies behind the cornea, and is adjustable, like the lens of your opera glass, and for the same purpose, of adaptation to the angle of vision to the distances of objects, so that one can see objects at the distance of an inch or of a mile. Each inch in the mile multiplies the chances of erroneous adjustment 63,360 times; so that, supposing all the parts correctly and perfectly made ready for adjustment, the chances that the adjusting machinery of the crystalline lens of the eye is the result of the accidental happening together of a multitude of small favorable variations is more than 63,360 multiplied by 36,360 times, less than the chance that your spectacles, without anybody to choose and adjust the glasses, accidentally happened to fit your sight by natural selection. But this is only the beginning of wonders in the eye. The crystalline lens of that codfish on your table, the little glass-like pea on your plate, is not, like your spectacle-glass, one solid piece. "Its structure is complicated; but it consists, when fully formed, of fibres arranged side by side, and united into laminæ by serrations of their edges; the fibres originate in cells, the vessels are confined to the capsule, and are supplied from the central artery of the retina. When hardened in spirit it may be split into three sections, composed of concentric laminæ. It is made up of 58 parts of water, and 42 per cent of soluble albumen. The central parts are the densest."*

That all this structure, and adaptation of minute parts to each other, with provision for nourishment and growth, so as to preserve each of these easily destructible fibres and vessels in full transparency for perfect vision—that all this, I say, should be merely the outcome of a multitude of small accidental variations, out of an infinitely greater multitude of unlucky variations—that is the

* *American Cyclopedia*, VI., p. 115.

theory. It is hard to believe. Mr. Darwin himself acknowledges the difficulty. But he demands that every consistent evolutionist must believe it, or relinquish the theory of evolution. So he must.

And that is only the beginning of his trouble. For every other part of the body is constructed with equal skill. The ear is not less artistic. The lungs, the heart, the stomach, the blood, the nerves, are all equally full of wise contrivances. But the eye seems to have given Mr. Darwin more food for reflection than the other organs; and his attempts to account for its production by natural selection are at once laughable and pitiful.

He thus attempts to render the building of an eye by natural selection probable: "If we must compare the eye to an optical instrument, we ought, in imagination, to take a thick layer of transparent tissue, with spaces filled with fluid, and with a nerve sensitive to light beneath, and then suppose every part of this layer to be continually changing slowly in density so as to separate into layers of different densities and thicknesses placed at different distances from each other, and with the surfaces of each layer slowly changing in form. Further, we must suppose that there is a power represented by natural selection, or the survival of the fittest, always intently watching each slight alteration in the transparent layers; and carefully preserving each which under varied circumstances, in any way, or in any degree, tends to produce a distincter image. We must suppose each new state of the instrument to be multiplied by the million; each to be preserved until a better one is produced; and then the old ones to be all destroyed," * etc., etc.

One reads this with amazement. It is not worth while to present facts to such a mind, nor to tell him that no such process appears in nature; that the first eyes, those

* *Origin of Species*, p. 146.

of the first seeing trilobites, are as perfect as those of the last. What he wants is not facts, nor yet fictions, but ready-made materials for an eye-factory. I have already shown that, supposing all the parts of an eye ready made and fitted, the probabilities against their happening together by chance are millions against one. But that is only the beginning of the difficulty. How are the materials to be made? Mr. Darwin modestly asks "a thick layer of transparent tissue;" just as one would order a box of 24-ounce window-glass, 9 by 12. Transparent tissue! Why every inch of transparent eye-tissue consists of many thousands of fibres, each of which is a living thing, whose transparency is liable to be destroyed by the slightest accident. Where are we to get it? How is natural selection to manufacture it? It is Mr. Darwin's first duty to provide his materials. Next he demands "spaces filled with fluid." That is, a counter full of glass phials full of water, and many other transparent chemical fluids. Well, Mr. Darwin, how is the survival of the fittest to get us our spaces filled with fluid, put up in little transparent sacs, or phials? These fluids, too, must be of different densities. But how is the little primeval moneron to know just the right density for the humour of its eye? and where is it to get it out of the salt water? Next he simply asks "a nerve sensitive to light." A nerve sensitive to light! One would think that Mr. Darwin considered that a very common-place affair. Were nerves sensitive to light lying around loose, like bits of twine in the sweepings of shops, in those old geologic times? Just be good enough to pick up a dozen or two nerves sensitive to light, and Natural Selection will make you a nice assortment of eyes out of them!

Had *Punch* presented Mr. Darwin's demand at the foot of one of Leech's caricatures, the world would have roared with laughter at it as a capital burlesque. But Mr. Darwin

offers it in all seriousness to abate our incredulity as to the possibility of the eye having been formed by small accidental favorable variations. Evidently his mind does not measure possibilities by any standard common to men.

Did space permit, we might go and fill volumes with exposures of the absurdities of attributing the wonderful contrivances of God's handywork to natural selection, but these specimens must suffice.* But there is one crowning absurdity of the theory which we must not omit, namely, that

12. *It Attributes the Elevation of Man and of all Animals to an Agency—the Struggle for Existence—which cannot possibly have Elevated these Higher Races, since it is always a Degrading Agency.*

Let it not be forgotten that this, together with accidental variation, constitutes the sole power which has advanced the moneron to the man. It is therefore, by the theory, an elevating agency.

It has been said that Mr. Darwin does not claim that it *elevates* species, but only *preserves* the fittest, or "keeps the species up to its normal vigor."

I ask then, What has elevated the moneron to the monkey, and the monkey to the man? What has elevated all the higher animals from the primeval monera?

Mr Darwin's whole book answers, Natural Selection, or the survival of the fittest in the struggle for existence.

Then I answer, That is impossible. The struggle for existence is a degrading agency. In no case has any

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* Among the countless evidences of Intelligent Design in nature, may be noticed the *mathematical exactness*, and unvarying uniformity, of the chemical components of various natural substances, which are combined in arithmetical proportions, and with a uniformity and accuracy of composition which the most skillful chemist cannot parallel: and also the demonstration of a *mathematical mind* in the Creator, as shown in the laws that govern the existence of plants, animals and men; as well as in the laws of celestial motion, the production of typical forms, the mathematical laws of light, color, sound, etc. The curious reader who wishes to glance at the *Mathematics of the Universe* is referred to a lecture delivered by Edward White, in New College, London, entitled *Number in Nature*, printed in No. 17 of the ANTI-INFIDEL LIBRARY.

individual been made more vigorous by scarcity of food, or of air, or of water. In the struggle for existence the strongest survive; but they survive weaker than if they had not been obliged to live on short rations. The survivors of the Black Hole of Calcutta were the strongest, and so survived the weaker; they survived, and that was all. They were weakened, and sickly, and poisoned, and died prematurely. The survivors of the Irish famine of 1847 were wan and weak, and multitudes, hunger-weakened, died from the fevers and dysenteries so fatal to weak constitutions. The wars of the French Revolution and Empire so reduced the stature of the people as to necessitate the reduction of the standard height of soldiers from two to three inches. Mr. Darwin's own illustration of the effects of frost on a bank covered with various plants, shows us that the surviving plants survived frost-bitten and weakened. Such is always the result of the struggle for existence—degradation. It is the crowning absurdity of Darwinism that it ascribes the elevation of all the higher plants and animals to this degrading agency.

The struggle for existence does not tend to elevate mankind. The painful records of shipwreck, exploration, hardship, and starvation, abundantly show that in this struggle men become brutalized, and destroy and prey upon each other like wild beasts. According to the evolution notion, every man who passed through such a struggle, should come out elevated in mind, invigorated in body, and spiritualized in soul—a hero, and the progenitor of a race of heroes who would, in a few generations, supersede the sons of those who were well fed and cared for. For thus, and only by this agency, the evolutionists assure us, our European forefathers were elevated from brutes to men. Numerous facts and incontrovertible statements utterly demolish this baseless theory.

We read with unspeakable horror the records of the fate of men reduced to the last extremity of want and hunger. If after such awful and disgusting demonstrations of the degrading effect of the struggle for existence, any one shall continue to assert that to its elevating influences for successive generations, man owes his elevation from the brutal state to the dignity of civilization and religion, the common sense of mankind will own the justice of God in giving him over to strong delusion, to believe the lie. But let us hear no more of the survival of the fittest as the progenitor of a race of heroes, since records of the horrors of starvation, familiar to all, have forever buried that monstrous falsehood, and with it the whole theory of evolution of which it is the inspiring demon.

V. *Mr. Darwin's own Admissions are Fatal to his Theory.*

1. *His express admissions are destructive.* For instance, his whole theory is based on the *indefinite* variabilty of all species. But when he comes to particular cases he is compelled to acknowledge the existence of an internal barrier to change in certain cases. He himself shows the very small amount of change possible in the guinea-hen, the peacock, and the goose; and he adds the remark, "But the goose seems to have a singularly inflexible organization;"* which, as his brother evolutionist, Mr. Mivart, remarks, *concedes the whole position.* This is not the only place in which such expressions are used.†

Sexual selection is his grand manufacturer of all the oddities and ornaments of fowls; but in his 5th Edition of *Natural Selection*, p. 102, he admits that the wattles of carrier pigeons, the tuft of the turkey-cock, etc., are not traceable to that source. As they are of no conceivable use, they cannot be made by natural selection, which

* *Animals and Plants under Domestication*, pp. 1, 289, 295.

† *Genesis of Species*, p. 133.

makes only profitable variations. These trifles confound him. Perhaps that was one purpose of their creation.

He says: "If it could be proved that any part of the structure of any one species had been formed for the exclusive good of another species, it would annihilate my theory, for such could not have been formed by natural selection."* But he immediately attempts to show that the rattlesnake's rattle is not for the benefit of its prey, but as a threatening for self-defence! Only a Darwinian will believe it. Natural Selection, Mr. Darwin must confess, has been scared to death by the rattlesnake's rattle. Again, in page 207, he shows us that the aphides excrete their honey for the benefit of the ants, and will not excrete it unless they are present; though he will not own that it is for the *exclusive* benefit of the ants. But he cannot suggest any possible benefit of the act to the aphides. Here again natural selection fails, by his own confession, to produce an instinct.

He admits the fatality of the doctrine "That many structures have been created for the sake of beauty, to delight man or his Creator, or for the sake of mere variety. Such doctrines, if true, would be absolutely fatal to my theory."†

But he admits the existence of a love of beauty in birds, yet his theory denies it in the Creator of these birds, who is a most utilitarian sort of a being. "On the other hand I willingly admit that a great number of male animals, as all our most gorgeous birds, butterflies, etc., have been rendered beautiful for beauty's sake; but this has been effected through sexual selection, that is, by the more beautiful males having been continually preferred by the females, and not for the delight of man."‡ He adds, "How the sense of beauty in its simplest form

* *Origin of Species*, p. 162. † *Origin of Species*, p. 160.

‡ *Origin of Species*, p. 161.

—that is, the reception of a peculiar kind of pleasure from certain colors, forms, and sounds—was first developed in the mind of man and of the lower animals *is a very obscure subject.*" Very! There is not the slightest use in the metallic lustre of the feathers of the drake, or in the eyes of the peacock's tail. How came they there? How came the birds to be pleased with them? Beauty is fatal to natural selection.

Mr. Darwin's admission that the production of beauty for its own sake would be fatal to his theory, has been a great stumbling-block to minds disposed to accept the general principle of evolution. It vulgarizes the Creator into a mere utilitarian factory-owner; and it contradicts the instincts of humanity. Even the child loves the rose, and chases the butterfly; and every woman endeavors to adorn her house.

The Duke of Argyle earnestly protests against this utilitarian vulgarism. Speaking of the 430 species of humming-birds, only distinguishable by their varied beautiful plumage, the beauty of which is not of any use in the struggle for existence, he asks: "Now what explanation does the law of natural selection give—I will not say of the origin—but even of the continuance of such specific varieties as these? None whatever. A crest of topaz is no better in the struggle for existence than one of sapphire. A frill ending in spangles of the emerald is no better in the battle of life than a frill ending in spangles of the ruby. A tail is not affected for the purposes of flight, whether its marginal or its central feathers are decorated with white. It is impossible to bring such varieties into any physical law known to us. It has relation, however, to a Purpose, which stands in close analogy with our knowledge of purpose in the works of men. Mere beauty and mere variety for their own sake are objects which we ourselves seek, when we can

make the forces of nature subordinate to the attainment of them. There seems to be no conceivable reason why we should doubt or question that these are ends and aims also in the forms given to living organisms, when the facts correspond with this view, and with no other." *

Mr. Darwin made a fatal admission when he owned that the production of beauty for its own sake would be fatal to his theory. All the philosophers from the earliest ages have called the universe, The *Cosmos*—the adorned, the beautiful. Has it been reserved for the nineteenth century to lose the sense of beauty, and sink into the miry clay of Darwinism?

2. *Mr. Darwin's Unconscious Admissions are even More Emphatic and Destructive of his Theory.*

He makes a continued use of the language of design, purpose, contrivance, and intention all through his book. As the Duke of Argyle well says: "He exhausts every form of words, or of illustration, by which intention or mental purpose can be described. 'Contrivance,' 'beautiful contrivance,' 'curious contrivance,' are expressions that occur over and over again. Here is one sentence describing a particular species (of orchids): 'The lobellum is developed *in order* to attract the lepidoptera; and we shall soon see the reason for supposing that the nectar is *purposely* so lodged that it can be sucked only slowly, *in order* to give time for the curious chemical quality of the matter setting hard and dry.'" †

Mr. Darwin's answer to this objection is, that it is hard to keep from personifying nature. It is so. But why is it hard to keep from attributing the evidences of skill and contrivance in nature to a person, but because they can only be exhibited by a person? The reign of the law of gravitation, which he adduces as an illustration, must be the exercise of force in an orderly manner, and so it must

* *Reign of Law*, p. 247.

† *Reign of Law*, p. 40.

be the reign of God. Mr. Darwin cannot describe an impersonal Governor of the world.

Here, in the last edition of *The Origin of Species* (1872, p. 426), is another remarkable example of the conviction of purpose in the structure of animals forcing itself upon his mind, and compelling utterance: "When we contemplate every complex structure as *the summing up of many contrivances*, each useful to the possessor, in the same way as any great mechanical invention is the *summing up of the labor, the experience, the reason*, and even the blunders of numerous workmen; when we thus view each organic being — I speak from experience — how much more interesting does the study of natural history become."

In this extended comparison of nature's machinery with man's, he is compelled not only to concede reason and design, but a long continued course of both, for the benefit of the creatures. Thus unconsciously he is constrained to acknowledge the existence of a benevolent Designer and Governor of the creatures constantly caring for their welfare, in the most direct contradiction to his whole argument.

VI. *The Leading Scientists Declare these Difficulties Insuperable; and Refuse the System of Darwin.*

Professor Huxley will be recognized by every one acquainted with this subject as most assuredly not prejudiced against Darwinism. Yet in his formal review of the theory he says: "So long as the evidence at present adduced falls short of supporting that affirmative, the doctrine must be content to remain among the former (the hypotheses) . . . . still a hypothesis and not yet a theory of species. After much consideration, and assuredly with no bias against Mr. Darwin's views, it is our clear conviction that, as the evidence now stands, it is not absolutely proven that a group of animals having all the

characters exhibited by species in nature, has ever been originated by selection either artificial or natural."*

St. George Mivart, F. R. S., also, after enumerating the objections and difficulties of the theory, and reviewing them over 240 pages, says: "A cumulative argument thus arises against the prevalent action of natural selection, which to the mind of the author is conclusive. As before observed, he was not originally disposed to reject Mr. Darwin's fascinating theory. Reiterated endeavors to solve its difficulties have, however, had the effect of convincing him that that theory as the one, or as the leading explanation of the successive evolution and manifestation of specific forms, is untenable. At the same time he admits fully that natural selection acts, and must act, and that it plays in the organic world a certain, though a secondary and subordinate part."†

Space will only permit one other testimony, and we will take it from one of the ablest American evolutionists, Professor Winchell. After a lucid exhibition of the difficulties, covering 90 pages, of the last of which—the necessity of multitudes of animals simultaneously exhibiting similar minute favorable variations in the same region, and for thousands of generations, in order to overcome the preponderant numbers of the original type—he says: "It seems to us the Darwinist is here placed in an appalling dilemma, and that the only rescue is in precipitate retreat." He goes on to add: "In offering this array of difficulties, which the theory of the organic evolution of organic beings must encounter and vanquish, we have not taken the time to indicate distinctly against what phase of the doctrine the difficulty more especially presses. We think it proper therefore to state in general, that all the objections seem to be valid against those forms of the doctrine which assume a gradual variation involving

* *Lay Sermons*, p. 323. † *Genesis of Species*, p. 240.

vast periods of time, and necessitating the intervention of all conceivable links. That is, they all rest against the theories which appeal solely to external influences, like those of De Maillet and Darwin, etc. . . . . The principle of natural selection, or survival of the fittest, it ought to be remarked, though inadequate to account for the *origin* of new forms, may be legitimately appealed to for their preservation when produced by any adequate means. Viewing specific types as absolutely constant, with a limited elasticity, it may undoubtedly be regarded the principle of the survival of the fittest which maintains the species at the healthful standard of normal vigor."* On page 49 he says: "The Lamarckian theory of inherent appetency is little insisted on at the present day; and unmodified Darwinism, it may be added, has fallen into disrepute. Neither Huxley, nor Parsons, nor Mivart, nor even Wallace, one of its original propounders, accepts the doctrine in its integrity," etc.

Darwinism, then, has had its day, like many another once popular ism and ology. It has been succeeded by a number of rivals for popularity, each evolutionist having an improved theory of his own. But none of them has equaled Mr. Darwin in presenting a multitude of facts in pleasant popular style, nor in dressing up fictions as plausible presumptions; and so none of them has achieved anything like his popularity. If the preceding view of the difficulties of the theory has satisfied my readers that Darwinism is an untenable hypothesis, I do not suppose they will try to lasso another horse out of that band, for Darwin's is the best of the drove; and we see how he has stumbled and thrown his rider. It is needless to discuss improvements in the saddle when the rider has broken his neck.

I have not glanced at all at the difficulties connected

* *The Doctrine of Evolution*, p. 79.

with the evolution of man, nor at the moral and religious problems raised by the survival of the fittest as the law of society. These we hope to consider hereafter.

The failure of natural selection leaves us in possession of the Bible account of creation; that "God created the beast of the earth after his kind, cattle and creeping things of the earth after their kind;" birds, and fishes, and the great geological monsters, after their kind; and they continue as He created them. The death of Darwinism leaves us also in undisputed possession of all the evidence of the wisdom and goodness of God which Christian philosophers have delighted to discover in the beautiful contrivances of the structures of plants and animals. That result is worth contending for. In the struggle for existence God still lives, and shall live, even in the principle of the survival of the fittest. It would be a poor exchange for the struggling world of working men to accept Natural Selection instead of our Father in heaven.

"The heavens declare Thy glory, Lord,
In every star thy wisdom shines;
But when our eyes behold thy word,
We read thy name in fairer lines.

The rolling sun, the changing light,
And night and day thy power confess;
But the blest volume Thou hast writ
Reveals thy justice and thy grace."

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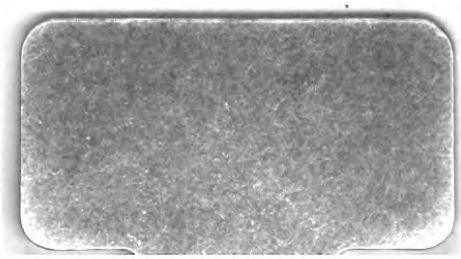
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