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ARTICLE I.

## THE WESTMINSTER REVIEW ON "CHRISTIAN REVIVALS."

The maxim of the wise man, that "there is nothing new under the sun," that, "that which hath been is that which shall be," seems to meet its verification in nothing more clearly than in the ever-recurring cycles of opinion. To a philosophic mind, observing the course of human history, nothing seems more clear than that certain forms of opinion held by men in all recorded ages, are continually disappearing, and being re-produced. As the occasions which give rise to these forms of opinion become more fully developed, and their advocates become overborne by counter testimony or argument, the peculiar phase then assumed by these opinions vanishes and is held in abeyance for a time. But as the world rolls on, and the restless activity of human thought evolves new theories, or new combinations of old theories, the exploded sophism is re-constructed, and made to figure on the arena of discussion, until it is again consigned to its temporary obscurity. As an illus-

nations by the Hebrew Scriptures and Theocracy. The position will stand the test of the most rigid scrutiny, that just in proportion as fragments and particles of this Divine truth have been incorporated into the philosophies and mythologies of Paganism, in *that* proportion has the moral nature of man been developed and elevated. Whilst, on the contrary, it will be found true beyond contradiction, that where this traditional revelation has not penetrated, there the moral part of humanity is wholly undeveloped, and man is but the king beast!

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ARTICLE V.

THE KNOWLEDGE OF GOD, AS OBTAINED FROM  
SCRIPTURE AND FROM NATURE.

We offer to the attention of our readers—and we hope to commend it to their reason—the following proposition: *The knowledge of God, as obtained from Scripture and as obtained from Nature, will approximate indefinitely, but never entirely coalesce in this life.* Let us not be misunderstood: the folly of supposing that truths ever conflict, can not be committed by any believer in the existence of God; but the harmony of truths in themselves is one thing, and the harmonizing of truths, as imperfectly discovered by man, with those consummately enunciated by God, is a very different thing. The first exists by necessity; the second, as we hope to show, can be approached, but not attained.

One element in the discussion may be very briefly disposed of: there will be no division among the readers of this Review as to the worth or truth of the Scriptures. They are a conveyance, in divinely appointed words, of that which God knows to be true, and which He wishes us to

learn by revelation. Not, surely, of all that is true on any given point, but of so much as the All-Wise Teacher saw fit to communicate *in that way*. And though many difficulties of interpretation remain unconquered, and we are thus left unassured, in certain cases, of the truth that is conveyed, for the purposes of this argument we may consider the meaning of Holy Writ to be fully ascertained, and even demonstrated. Or we may employ these very deficiencies in our argument, *a fortiori*, thus: If the perfect reconciliation of Scripture and Nature would be impossible, even if we knew exactly and every where what the Bible intends, how much more hopeless does the attempt appear, when the sacred meaning is not yet perfectly defined?

As to the other element—the knowledge of God obtained from nature—the words of Paul convey our thought exactly: “We know in part \* \* \* when that which is perfect is come, then that which is in part shall be done away.” The phraseology here is striking, and the turn given to the thought quite unexpected. He does not say that our partial knowledge shall be completed, but done away, or destroyed, on the arrival of perfect knowledge. From which it appears, as can, also, be otherwise demonstrated, that imperfect knowledge partakes more or less of the nature of error, and needs correction or replacement, ultimately, rather than simple extension.

Now, if this be true, it involves consequences of signal importance as to the probable results of scientific study, and the true relations of Natural Science to Theology. We propose, therefore, to offer a few reflections upon the imperfections of human knowledge, for the sake of certain inferences, which will appear in their turn.

It is not without an effort, in these last days, that we obtain any adequate impression of the bright audacity that first attempted Science; that set out, resolved to read Nature’s cunningly hidden secrets, and register her unpublished laws. Astronomy was man’s first success; the

ὑπομονή ψυχική of the starry company—the mind-like steadfastness of their recurrences—invited study, encouraged memory, kindled fancy. And yet, how long the old stargazers were baffled as to the system of the heavens; how often they had to “try back” beyond their old opinions, or add a new volume to their theories! To the Astrologer, the stars were living intelligences; to Ptolemy, the jewels on the wheels of crystal spheres; to La Place, the cogs, pinions and balances of a self-regulating engine. Now, we know them, the radiant centres of cosmical influences; their “mystic dance” is threaded in some of the smaller and nearer regions of their infinite array; and we wonder, as well we may, at our own achievements. One might almost say, that if man could have imagined, beforehand, what he was going to know, he would never have dared the mighty adventure.

But if this impresses us in the most ancient, most complete, and, perhaps, most simple of the sciences, what shall we say if we look to its antipode, Organic Science? All previous lines of knowledge interlaced, and that subtle, incessant force we call Life presenting an uneliminable unknown quantity in every equation, it is like trying to braid up the tangled tresses of light in the mountain brook, or to marshal the ripples of the breeze-awakened sea in geometrical forms, to attempt the systematizing and intellectual mastery of the boundless and obscure phenomena it presents.

Yet man has attempted these things; and his victories have been little less than miraculous. Apparent chaos obeys the voice of order, and confesses the eternal supremacy of law; discordances vanish or are reconciled; and the veteran philosopher crowns the toil of ages by graving Cosmos on the pillars of the still unfinished temple. The principles that have been traced here and there are boldly projected upon the universe, like the earth-drawn meridian of the geographer. But the temple is unfinished, and the

projections are often made by fancy, and not by honest reason.

How incomplete the work of science is, and must be, will appear in part from the following considerations.

First: *The imperfection of the instruments employed*—alike the material implements, and the indispensable instrument, language.

If we turn to Astronomy again, we find not only defects in the telescope, but counter-defects. Chromatic and spherical aberration proceed from different causes, and the most natural remedies of the one aggravate the other. True, human ingenuity has, in some measure, compromised the conflicting tendencies, but this is at the expense of increased absorption of light. Now, as it is upon light that the telescope depends for the information it conveys, there is obviously a limit to the possibility of correcting errors in telescopic study, in the very nature of the instrument.

So, again, in order to perfect command of its vast powers, the telescope must be completely *clamped* by the machinery which guides it; but, to prevent vibration, its connection with the earth must be as free and slight as possible. Here, also, plainly, is imperfection made permanent by the conflict of difficulties. They can be obviated with indefinite, but not absolute, success.

These must suffice as illustrations here; they could be largely multiplied, as no one knows so well as the Astronomer. But in microscopy, these tendencies to error, due to the nature of the instrument, are enormously increased. The very power that magnifies the object, magnifies its own errors also. The literary world is flooded with books of physiological and animalcular study; and the pages of many of them teem with monsters which have no existence, save in the distorting glass or the inexperienced eye. In truth, microscopic observation seems to be a sort of *divining*—a knack developed, by long practice, out of native gift. The language has been quoted to us from a lecture of

Agassiz, that a naturalist must look at least a half-hour through the microscope before his estimates of what he sees are worth any thing at all. And it is notorious, that most eyes fail, and are utterly exhausted, before that indispensable, but wasted, half-hour has been fulfilled.

Not to multiply instances, in all minute questions of duration there is the inseparable—which is also the indefinable—element of the time occupied in impressions upon the senses, and in primary mental acts. We call them instantaneous, and so, for all the purposes of common life, they are; but not for the *perfection* of optical, acoustical, and other such experiments. And, still more generally, we may say that the limited powers of all material objects and resources, while they may to some extent be played off against each other, make a certain amount of imperfection and error inevitable in science.

The imperfections of language, as one of the implements of scientific labor, deserve some remark in this connection. Whatever may be true of some of the spontaneous and (in some sense) instinctive mental processes through which the mind flashes, like the electric spark through a chain, there can be no question that all ordinary voluntary ratiocination is transacted in words. Now, when we reflect, (*a*) that many terms, as invented or applied, contain an unnoticed ambiguity—(*b*) that derivative words carry with them, in some degree, the aspect of their originals—and (*c*) that most scientific names are given in advance of the complete comprehension of the thing named, so that the same mind's impression of the meaning of a term varies unconsciously—we shall have some faint conception of the treachery of that material whereof our intellectual fabric is wrought.

We doubt whether statements so obvious and familiar can require illustration, but it may be well to append a remark or two.

The phrase, "law of nature," is a most signal example

of the first difficulty mentioned above. In natural history, it formerly meant merely a generalized observation; it is now acquiring the signification of a principle of genetic development: in Chemistry, it is a discovered affinity, or a mode of combination: in Natural Philosophy, a tabulated formula of experiences, which may or may not be properly classed together—and so through the whole range of sciences. Now, the misemployment of this single term has vitiated the reasoning of a whole school of thinkers, from La Marck to the author of the “*Vestiges of Creation.*” And to this day, its equivoques make half the battles of secular and sacred science; to say nothing of the capital wrested from it to furnish out the would-be sciences, that are only quackeries, like Phrenology.

The second remark, that derivatives retain something of the peculiar aroma of their originals, illustrates the inaccuracy of reasoning which turns on a partially technical term. Chemistry, Pathology, Mineralogy, Geology, might each and all furnish us examples under this head. A hidden variation in the value of a term would similarly affect the equations of the Algebraist.

The third point, however, particularly invites illustration. Most names employed in science have been conferred in advance of thorough comprehension of the thing named (e. g. the “planets” of the astronomer and the “salts” of the chemist); and thus the meaning of the name has varied with the progress of the student. Think of the boy, Faraday, using the word Light. Its utmost eloquence will only recall to him the splendors of the rising or departing sun, the shimmer of the moonlit sea, the ruby dew-spark on the grass, or the miraculous rainbow crowning the clouds with a sudden glory. As his studies take that direction, and, from one subtle thought and magical experiment to another, he advances to profounder acquaintance with that obscure power, one of whose manifestations under certain conditions is luminosity, how vast a revolution has taken place

in the meaning of the term! And how great the logical importance of the question, whether, in a given investigation, he has employed the original L, or L', or L'', etc.

But if we turn from language as the implement of thinking, to language as the vehicle of thought or knowledge, these difficulties are vastly increased. There is, for example, the difference between the speaker's and the hearer's estimate of the meaning of a word. One may borrow here the odd conceit of a witty, but dangerous, writer of our own day, that there are at least *six* interlocutors in every *dialogue*: there are (1) A, and (2) B, (3) A's estimate of A, and (4) B's estimate of B, (5) A's B, and (6) B's A. So in speech: there is the simple meaning of the word, and the effect upon it of the context; there is, also, the shade of meaning due to the idiosyncrasy of the speaker, A, and and that peculiar to the hearer, B,—matters not appreciable in either case by the other party, though cognizable. Theological controversy has been largely constructed out of these very misapprehensions, but Natural Science has not escaped them. It was our fortune once to hear an intelligent and even scientific gentleman, who was also an unusually good Greek scholar, criticise Lyell severely for introducing into Geology the words Miocene, Pleiocene, and Pleistocene. That eminent *savant* should have known better, he protested, than to have formed, in that manner, the terms which should mark formations less new, newer, and newest. He had not noticed that the two first syllables in each word represented the plural neuter of the adjective, and that the fact declared by those vocables was the less or greater *proportion* of modern shells in the respective formations.

Of course, this difficulty increases rapidly with the subtlety, the originality, and the novelty of the matters treated of. It becomes ever the more difficult to imbed the fleeting, impalpable, arduous conception in words that shall forever after be its own. The scholars dispute at the Profes-



sor's obsequies, as to his intent and opinion on this and the other department of his deliverances. The path of science is measurably diverted by the contest, and by the associations which hang as thick about the terms as swarming bees about their branch. Or, on the other hand, the power of some early student fastens an unhappy terminology on the science he affects, and thus clogs its march or impairs its beautiful exactness.

Further illustration cannot be necessary; evidently, with all the vast, elastic powers of language, it is not a perfect instrument; it enables us neither to think with absolute correctness, nor to preserve our thought in its original identity, nor to transmit it with infallible certainty.

From these desultory observations on the imperfections of the instruments of science, we turn, for a moment, to notice *the necessary incompleteness of human knowledge*. And our rapidly diminishing space warns us rather to indicate, than to follow out, the suggestions that occur.

This incompleteness results, in part, from the vast range of fact to be known. A masterly writer in the *Edinburgh Review*, some years ago, remarked that Chemistry was no longer one science, but ten; and that no student, who understood himself or his work, any longer hoped to grasp them all equally. It was victory enough to have thoroughly possessed one's self of one, and to be tolerably familiar with the facts and principles that were salient in the others. The same thing is true of Geology, Astronomy, and indeed of every full-grown and opulent science. And the difficulty is not, merely, that division of labor is thus made necessary; but that the lines of investigation thus necessarily distributed are not independent. Each is in momentary need of the other.

More striking still is the inherent undefinableness of the particular sciences. The *terminus a quo* of some may be said to be ascertained; in Mathematics, at least, the definitions may be said to constitute such a terminus. But where shall

the *terminus ad quem* of any science be found? Where does Geology cease and Cosmogony begin? Where do Botany and Zoölogy touch? Who has set up the terminal monument of Anatomy, Physiology, Organic Chemistry?

There seems to be an ascertained impossibility of completing some discoveries. Of this Hugh Miller has given us a fine example in his "First Impressions of England," in a passage we wish it were possible to quote in full. Its drift, however, can be gathered from a few detached sentences. "It seems more than questionable whether we shall ever arrive at knowledge approximating to correct, regarding the distribution of ocean and continent in the earlier or even secondary geologic formations. \* \* \* The geology of these older formations, whether Palæozoic or Secondary, cannot be other than imperfect. Any one system, as shown on the geologic map, is but a thing of shreds and patches. \* \* \* The field of the map in each instance resembles one of those dilapidated frescoes of Pompeii, in which by much the greater part of the plaster has fallen from the wall, and we can trace but broken fragments of the future on the detached bits that remain."

Something might be said, also, of the subtilty of the connections of sciences in many directions; and more, of the incommensurability of sensations, organic impressions, and even opinions: but we hasten to call attention to the reflex influence of these omitted or undiscovered truths, or of unsettled questions. What philosopher does not feel that the brake was lifted from the progress of Optical Science, when Opticians agreed at last upon the "undulation," as distinguished from the "emission" theory? Who does not desire a similar settlement, in electric, of the question of two fluids or one? And, to return to Hugh Miller, how many geological problems would solve themselves, if the undecipherable geography could be read? In particular, that very problem he has urged and venturously attempted to dispose of—the origin of the rock-salt beds

in the earth—would doubtless find immediate solution in a complete geological geography.

Here, again, in the necessary incompleteness of Natural Science, and the reflex influence of the hiatus, we find clear evidence that perfect knowledge of nature is approachable, but inaccessible.

The same truth appears again in *the intrinsic imperfections of the mind, the knowing power, itself*. To say nothing here of local mental infirmities, precariousness of memory, weakness and want of balance among the faculties, and other such defects, let us reflect on the inbred necessity for investigating upon the line of a hypothesis, and converting it into a theory. That is to say, a partial, cursory, superficial survey, suggests the principle, to which, by a sort of elective affinity, facts that favor it more or less perfectly are attracted. That principle is no doubt modified somewhat as the accretion advances: modified but not transformed. The facts, as they are in nature, do not and cannot possess and mould the theory. Thus the very plan of the investigation secures one-sided and partial acquisition; insures, also, an opposite theory to correct these partialities and include omitted facts. Thus knowledge advances by a series of fluctuations; its course is not a right line, but a curved and recurved one, crossing the axis, but not coinciding with it. The *humanness* of the stand-point, therefore, involves the imperfection of science.

But we may go farther, and allege that different pursuits develop and bring out different qualities of mind, so that a partial and unsymmetrical education of his powers is the very condition of the student's familiarity with this or the other region of knowledge. The very distinctions that we draw in characterizing our friends, show the spontaneous judgment of mankind on this point. We say of one, that he has a mathematical mind, and of another, that his is a philosophical mind: whereby we not only convey our opinion that these men have certain qualities, but,

also, our impression that they are not equally well furnished as regards certain other powers. Far be it from us to deny that these several forces can exist in one intellect. Fact and philosophy would alike contradict us there. But it is unquestionable that the prevalence is almost invariably with the inductive or the deductive temper of the mind; and that certain pursuits give exercise and growth to one rather than the other of them.

There are sciences whose steps are like the march of great armies—covering whole territories by a comprehensive survey, and possessing them by the sweep of broad truths. Others are minute and microscopic, habitually collecting their formulæ, not from “wise saws,” like the first, but from “modern” and innumerable “instances.” Some find the necessary clue in bold theories—theories, in some cases, sublimely audacious. Such were the Plutonic theory in Geology, and the principle of gravitation as announced by Newton. Others eschew these daring flights, and must feel the solid foundation beneath them every moment.

Now, it is self-evident that the mind which draws in one of these directions must either have a native bent thither, or, yielding to some strong external pressure, must be thereby moulded accordingly. Rare, indeed, can be the exceptions. One Aristotle and one Humboldt must suffice the world for sixty centuries.

We are painfully sensible that this article crosses these vast tracts of thought, as the cannon ball traverses the waves—*ricochét*—glancing along the crests of unentered deeps, and quickly exhausting itself upon the surface. But if we have succeeded in setting in plain view the truth, to us so unquestionable, announced at the outset, we shall have little to regret. The endless bickerings between Theology and Science have discouraged many an ingenuous young thinker, and driven him to abandon the attempt—almost the hope—to enjoy intelligently his Bible and the Book of Nature too; have furnished the forward and too

willing sceptic with his most telling cavils; have bred a jealousy of bold research in the mind of the divine, and taught the sciolist to sneer at the ignorance and bigotry of the clerical body.

The proposition we have laid before our readers removes the assumption that the discrepancies of Science and Scripture are substantive facts, and strips off the disguise of conflict in which ignorance, impatience and bigotry have arrayed the parties. For, clearly, if the two lines of study and discovery approximate, there must have been distance to overcome, and something of that distance must remain uncompassed. To say that in their progress they converge, is to say that they have not yet met. It appears from the course of this discussion that—apart from possible or probable errors of interpretation on the part of Theology—there is reason enough for the dissonance of the two voices in the imperfections of Science: that these imperfections involve an element of error in the interpretation of nature—error that can be pared down, but not extirpated—indefinitely lessened, but not absolutely removed. The discrepancies of which we have spoken, therefore, are simply *the measures of the imperfect approximation* of the two studies; they are purely subjective, and in no wise formidable, except to the presumptuous smatterer in Science, or to the blindly jealous Church.

On the other hand, the friends of truth, of either order, must not hope, by any amount of tugging at the raveled edges of Science, to match them perfectly with the shapely, the consummate patterns of revelation. The piece is not yet recovered which must fill this or the other particular corner; and, until it is recovered, it is idle to force a union which cannot endure, and which more perfect knowledge will assuredly put to shame. This remark might be signally illustrated by a review of the works which have been put forth to reconcile Geology and the Bible, from Granville Penn, or earlier, to Hugh Miller. The ink is hardly dry

upon the paper—the sheets are scarcely stitched in the bindery—when some new discovery reduces the discrepancy and upsets the reconciliation. Geology was once denounced as atheistic; but, in Agassiz's hands, it offers physical demonstrations of the fact of creation as strong as, in Comparative Anatomy, Cuvier has made the exhibitions of design.

It follows, that the proper attitude of Theology towards all disagreement, except that of patent and malignant infidelity, is that of the largest and most friendly tolerance. It was not merely a blunder, that Dean Buckland should have been hunted into insanity by the denunciations of rigid and ignorant orthodoxy,—it was a crime. It robbed the Church of a friend, and a noble heart of its earthly peace. It did more: it proclaimed the conviction of these religious assailants, that the honor of God would suffer from too close and careful a scrutiny of His works. It taught that He must only be looked at in the favorable lights of revelation, if men were to honor Him and trust His Son. Christians might stumble every day at the mysteries of His Providence; but woe to him who stumbled, if stumbling it were, at the mysteries of creation! It diffused a sense of insecurity through the Church, and confessed to the world a weakness that could have no existence, if the Bible were the Word of God. Thus was Christ wounded in the house of His friends.

Shall we never learn that our City hath foundations, and that her Builder and Maker is God? Suppose the extreme case of a demonstration by Science, that our present Scriptures were in error on sundry points that concern the material world; would a Christian of any discernment and intellectual courage surrender his Bible, his Saviour, or his hope of a blessed resurrection, on that account? Surely not. His faith is founded on something stronger and more vital than the minutiae of external or internal evidence. He knows that almost any thing else is more likely than

that the Scriptures are an imposture or a mistake, and while he glories in the minute verifications of their wisdom and truth, which the students of nature continually produce, yet, if such a contradiction should arise, he would cast his arms around the mighty pillar of our hopes, and defy the human interpreters of God's obscurer revelation to remove, or even shake it.

These remarks are the more necessary at present, in view of the momentous decision of the Synods to establish the Perkins Professorship. From our hearts we hail it and rejoice in it, as securing a wider culture to the coming generations of ministers, and as illustrating, by its very existence, the natural friendship of knowledge and piety. But the indispensable condition of any benefit from it, worthy of a moment's consideration, is the general prevalence of a spirit very unlike that which denounces Buckland, Hitchcock, and Hugh Miller as infidels. It must be the general purpose to allow large liberty of independent study; and we are not sure that all our brethren are prepared to exercise the necessary forbearance.

If we prosecute this novel experiment, we must dispose ourselves resolutely to see in daily display the doctrine we have been treating of—*the imperfect, but improving, approximation of Science and Theology*. Unadjusted differences of opinion and belief will appear among the Professors; but nobody must be frightened or impatient about them. Icebergs drift into populous and sail-dotted seas, and breathe fogs for a time; in the end they vanish: and so will these formidable-looking intruders into the seas of divinity.

The style and title of the Perkins Professor might well be, "Professor of the Friendship of Nature and Revelation;" for his work is, virtually, to demonstrate that friendship. Let him not be held to a daily struggle, literally to "evince" a "harmony" that is yet in great part undiscovered. We fear that in any such ill-understood and ineffectual effort, the harmony of the studies would not be *evinced* so largely

as the harmony of the Professors would be *evicted*. For—to return to our sartorial illustration—the edges of *both* the ill-matched tissues must be pulled and coaxed, and drawn awry, to compel a seam; and what will the guardians and dispensers of exegetical and didactic Theology say to such liberties taken with their goods?

On the other hand, what task can be more gracious, more honorable, more delightful, than that of bringing into ever new relief the friendly relations which already exist between Theology and Science—except it be the task of Theology itself? As we write, there rise before us the shadowy forms which habitually represent, in our conception, these two sublime instructors of mankind. First in age, in honors, and in power—silver-haired, benignant, pure—stands the consecrated interpreter of the ways of God to man. There is no fire of passion in his eye, nor clamor of bigotry upon his tongue; but the meek face, like that of Moses, is suffused with heavenly radiance—the inwrought splendor that comes of incessant intercourse with God. His rapt gaze reads off the signals as they shine from Heaven itself. Young and eager Science stands beside him, busied in deciphering the images of the signals as they glitter in the water, or dissolve their blended hues in summer clouds, or mingle with the shadows of the forest. Alike the rashness and the buoyancy of youth are his. A thousand mistakes have not discouraged him; ten thousand partial successes have not satisfied him. His strong young shoulder is ever at the service of his friend, and the hand of venerable wisdom continually guides his steps. The sense of kindred serenely possesses their hearts; the light of Heaven falls like a blessing all around them. For not only Theology, but Science also, is Heaven-ordained. The “servant and interpreter of Nature” is also the creature and pupil of God.