

The illustration depicts a fantastical, steampunk-inspired city. In the center, a tall clock tower with a clock face showing approximately 10:10 stands prominently. To its right, a large, spherical hot air balloon with a metal cage and a basket containing a figure is suspended in the air. The background is filled with various architectural structures, including domes, spires, and buildings with intricate details. The color palette is dominated by warm, earthy tones like browns, oranges, and yellows, contrasted with cooler blues and greys. The overall style is reminiscent of classic pulp magazine illustrations.

EDGAR A. POE

**EUREKA &
THE UNPARALLELED ADVENTURE
OF ONE HANS PFAALL**

Эдгар Аллан По

**Eureka & The Unparalleled
Adventure of One Hans Pfaall**

«РИПОЛ Классик»

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Edgar Allan Poe
Eureka & The Unparalleled
Adventure of One Hans Pfaall

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Eureka

Preface

To the few who love me and whom I love –to those who feel rather than to those who think –to the dreamers and those who put faith in dreams as in the only realities –I offer this Book of Truths, not in its character of Truth-Teller, but for the Beauty that abounds in its Truth; constituting it true. To these I present the composition as an Art-Product alone:–let us say as a Romance; or, if I be not urging too lofty a claim, as a Poem.

What I here propound is true:– therefore it cannot die:–or if by any means it be now trodden down so that it die, it will "rise again to the Life Everlasting." Nevertheless it is as a Poem only that I wish this work to be judged after I am dead.

E. A. P.

Eureka: An Essay on the Material and Spiritual Universe

It is with humility really unassumed –it is with a sentiment even of awe –that I pen the opening sentence of this work: for of all conceivable subjects I approach the reader with the most solemn – the most comprehensive –the most difficult –the most august.

What terms shall I find sufficiently simple in their sublimity – sufficiently sublime in their simplicity –for the mere enunciation of my theme?

I design to speak of the Physical, Metaphysical and Mathematical – of the Material and Spiritual Universe:–of its Essence, its Origin, its Creation, its Present Condition and its Destiny. I shall be so rash, moreover, as to challenge the conclusions, and thus, in effect, to question the sagacity, of many of the greatest and most justly revered of men.

In the beginning, let me as distinctly as possible announce –not the theorem which I hope to demonstrate –for, whatever the mathematicians may assert, there is, in this world at least, no such thing as demonstration –but the ruling idea which, throughout this volume, I shall be continually endeavoring to suggest.

My general proposition, then, is this: –In the Original Unity of the First Thing lies the Secondary Cause of All Things, with the Germ of their Inevitable Annihilation.

In illustration of this idea, I propose to take such a survey of the Universe that the mind may be able really to receive and to perceive an individual impression.

He who from the top of AEtna casts his eyes leisurely around, is affected chiefly by the extent and diversity of the scene. Only by a rapid whirling on his heel could he hope to comprehend the panorama in the sublimity of its oneness. But as, on the summit of AEtna, no man has thought of whirling on his heel, so no man has ever taken into his brain the full uniqueness of the prospect; and so, again, whatever considerations lie involved in this uniqueness, have as yet no practical existence for mankind.

I do not know a treatise in which a survey of the Universe – using the word in its most comprehensive and only legitimate acceptation –is taken at all: –and it may be as well here to mention that by the term "Universe," wherever employed without qualification in this essay, I mean to designate the utmost conceivable expanse of space, with all things, spiritual and material, that can be imagined to exist within the compass of that expanse. In speaking of what is ordinarily implied by the expression, "Universe," I shall take a phrase of limitation –"the Universe of stars." Why this distinction is considered necessary, will be seen in the sequel.

But even of treatises on the really limited, although always assumed as the un limited, Universe of stars, I know none in which a survey, even of this limited Universe, is so taken as to warrant deductions from its individuality. The nearest approach to such a work is made in the "Cosmos" of Alexander Von Humboldt. He presents the subject, however, not in its individuality but in its generality. His theme, in its last result, is the law of each portion of the merely physical Universe, as this law is related to the laws of every other portion of this merely physical Universe. His design is simply synoeretical. In a word, he discusses the universality of material relation, and discloses to the eye of Philosophy whatever inferences have hitherto lain hidden behind this universality. But however admirable be the succinctness with which he has treated each particular point of his topic, the mere multiplicity of these points occasions, necessarily, an amount of detail, and thus an involution of idea, which preclude all individuality of impression.

It seems to me that, in aiming at this latter effect, and, through it, at the consequences –the conclusions –the suggestions –the speculations –or, if nothing better offer itself, the mere guesses which may result from it –we require something like a mental gyration on the heel. We need so rapid a revolution of all things about the central point of sight that, while the minutiae vanish altogether,

even the more conspicuous objects become blended into one. Among the vanishing minutiae, in a survey of this kind, would be all exclusively terrestrial matters. The Earth would be considered in its planetary relations alone. A man, in this view, becomes mankind; mankind a member of the cosmical family of Intelligences.

And now, before proceeding to our subject proper, let me beg the reader's attention to an extract or two from a somewhat remarkable letter, which appears to have been found corked in a bottle and floating on the Mare Tenebrarum—an ocean well described by the Nubian geographer, Ptolemy Hephestion, but little frequented in modern days unless by the Transcendentalists and some other divers for crotchets. The date of this letter, I confess, surprises me even more particularly than its contents; for it seems to have been written in the year Two thousand eight hundred and forty-eight. As for the passages I am about to transcribe, they, I fancy, will speak for themselves.

"Do you know, my dear friend," says the writer, addressing, no doubt, a contemporary—"Do you know that it is scarcely more than eight or nine hundred years ago since the metaphysicians first consented to relieve the people of the singular fancy that there exist but two practicable roads to Truth? Believe it if you can! It appears, however, that long, long ago, in the night of Time, there lived a Turkish philosopher called Aries and surnamed Tottle." [Here, possibly, the letter-writer means Aristotle; the best names are wretchedly corrupted in two or three thousand years.] "The fame of this great man depended mainly upon his demonstration that sneezing is a natural provision, by means of which over-profound thinkers are enabled to expel superfluous ideas through the nose; but he obtained a scarcely less valuable celebrity as the founder, or at all events as the principal propagator, of what was termed the deductive or a priori philosophy. He started with what he maintained to be axioms, or self-evident truths:—and the now well-understood fact that no truths are self-evident, really does not make in the slightest degree against his speculations:—it was sufficient for his purpose that the truths in question were evident at all. From axioms he proceeded, logically, to results. His most illustrious disciples were one Tuclid, a geometrician," [meaning Euclid] "and one Kant, a Dutchman, the originator of that species of Transcendentalism which, with the change merely of a C for a K, now bears his peculiar name.

"Well, Aries Tottle flourished supreme, until the advent of one Hog, surnamed 'the Ettrick shepherd,' who preached an entirely different system, which he called the a posteriori or inductive. His plan referred altogether to sensation. He proceeded by observing, analyzing, and classifying facts—*instantiae Naturae*, as they were somewhat affectedly called—and arranging them into general laws.

In a word, while the mode of Aries rested on noumena, that of Hog depended on phenomena; and so great was the admiration excited by this latter system that, at its first introduction, Aries fell into general disrepute. Finally, however, he recovered ground, and was permitted to divide the empire of Philosophy with his more modern rival:—the savans contenting themselves with proscribing all other competitors, past, present, and to come; putting an end to all controversy on the topic by the promulgation of a Median law, to the effect that the Aristotelian and Baconian roads are, and of right ought to be, the sole possible avenues to knowledge:—'Baconian,' you must know, my dear friend," adds the letter-writer at this point, "was an adjective invented as equivalent to Hog-ian, and at the same time more dignified and euphonious.

"Now I do assure you most positively"—proceeds the epistle—"that I represent these matters fairly; and you can easily understand how restrictions so absurd on their very face must have operated, in those days, to retard the progress of true Science, which makes its most important advances—as all History will show—by seemingly intuitive leaps. These ancient ideas confined investigation to crawling; and I need not suggest to you that crawling, among varieties of locomotion, is a very capital thing of its kind;—but because the tortoise is sure of foot, for this reason must we clip the wings of the eagles? For many centuries, so great was the infatuation, about Hog especially, that a virtual stop was put to all thinking, properly so called. No man dared utter a truth for which he felt himself indebted to his soul alone. It mattered not whether the truth was even demonstrably such; for the dogmatizing

philosophers of that epoch regarded only the road by which it professed to have been attained. The end, with them, was a point of no moment, whatever: –'the means!' they vociferated –'let us look at the means!' – and if, on scrutiny of the means, it was found to come neither under the category Hog, nor under the category Aries (which means ram), why then the savans went no farther, but, calling the thinker a fool and branding him a 'theorist,' would never, thenceforward, have any thing to do either with him or with his truths.

"Now, my dear friend," continues the letter-writer, "it cannot be maintained that by the crawling system, exclusively adopted, men would arrive at the maximum amount of truth, even in any long series of ages; for the repression of imagination was an evil not to be counterbalanced even by absolute certainty in the snail processes. But their certainty was very far from absolute. The error of our progenitors was quite analogous with that of the wiseacre who fancies he must necessarily see an object the more distinctly, the more closely he holds it to his eyes. They blinded themselves, too, with the impalpable, titillating Scotch snuff of detail; and thus the boasted facts of the Hog-ites were by no means always facts –a point of little importance but for the assumption that they always were. The vital taint, however, in Baconianism –its most lamentable fount of error –lay in its tendency to throw power and consideration into the hands of merely perceptive men –of those inter-Tritonic minnows, the microscopical savans –the diggers and pedlers of minute facts, for the most part in physical science – facts all of which they retailed at the same price upon the highway; their value depending, it was supposed, simply upon the fact of their fact, without reference to their applicability or inapplicability in the development of those ultimate and only legitimate facts, called Law.

"Than the persons" –the letter goes on to say –"than the persons thus suddenly elevated by the Hog-ian philosophy into a station for which they were unfitted –thus transferred from the sculleries into the parlors of Science –from its pantries into its pulpits –than these individuals a more intolerant –a more intolerable set of bigots and tyrants never existed on the face of the earth. Their creed, their text and their sermon were, alike, the one word 'fact' –but, for the most part, even of this one word, they knew not even the meaning. On those who ventured to disturb their facts with the view of putting them in order and to use, the disciples of Hog had no mercy whatever. All attempts at generalization were met at once by the words 'theoretical,' 'theory,' 'theorist' –all thought, to be brief, was very properly resented as a personal affront to themselves. Cultivating the natural sciences to the exclusion of Metaphysics, the Mathematics, and Logic, many of these Bacon-engendered philosophers –one-ided, one-sided and lame of a leg –were more wretchedly helpless –more miserably ignorant, in view of all the comprehensible objects of knowledge, than the veriest unlettered hind who proves that he knows something at least, in admitting that he knows absolutely nothing.

"Nor had our forefathers any better right to talk about certainty, when pursuing, in blind confidence, the a priori path of axioms, or of the Ram. At innumerable points this path was scarcely as straight as a ram's-horn. The simple truth is, that the Aristotelians erected their castles upon a basis far less reliable than air; for no such things as axioms ever existed or can possibly exist at all. This they must have been very blind, indeed, not to see, or at least to suspect; for, even in their own day, many of their long-admitted 'axioms' had been abandoned: –'ex nihilo nihil fit,' for example, and a 'thing cannot act where it is not,' and 'there cannot be antipodes,' and 'darkness cannot proceed from light.' These and numerous similar propositions formerly accepted, without hesitation, as axioms, or undeniable truths, were, even at the period of which I speak, seen to be altogether untenable: –how absurd in these people, then, to persist in relying upon a basis, as immutable, whose mutability had become so repeatedly manifest!

"But, even through evidence afforded by themselves against themselves, it is easy to convict these a priori reasoners of the grossest unreason –it is easy to show the futility –the impalpability of their axioms in general. I have now lying before me" – it will be observed that we still proceed with the letter –"I have now lying before me a book printed about a thousand years ago. Pundit assures me that it is decidedly the cleverest ancient work on its topic, which is 'Logic.' The author, who was

much esteemed in his day, was one Miller or Mill; and we find it recorded of him, as a point of some importance, that he rode a mill-horse whom he called Jeremy Bentham: –but let us glance at the volume itself!

"Ah! –'Ability or inability to conceive,' says Mr. Mill very properly, 'is in no case to be received as a criterion of axiomatic truth.' Now, that this is a palpable truism no one in his senses will deny. Not to admit the proposition, is to insinuate a charge of variability in Truth itself, whose very title is a synonym of the Steadfast. If ability to conceive be taken as a criterion of Truth, then a truth to David Hume would very seldom be a truth to Joe; and ninety-nine hundredths of what is undeniable in Heaven would be demonstrable falsity upon Earth. The proposition of Mr. Mill, then, is sustained. I will not grant it to be an axiom; and this merely because I am showing that no axioms exist; but, with a distinction which could not have been cavilled at even by Mr. Mill himself, I am ready to grant that, if an axiom there be, then the proposition of which we speak has the fullest right to be considered an axiom –that no more absolute axiom is –and, consequently, that any subsequent proposition which shall conflict with this one primarily advanced, must be either a falsity in itself –that is to say no axiom –or, if admitted axiomatic, must at once neutralize both itself and its predecessor.

"And now, by the logic of their own propounder, let us proceed to test any one of the axioms propounded. Let us give Mr. Mill the fairest of play. We will bring the point to no ordinary issue. We will select for investigation no common-place axiom –no axiom of what, not the less preposterously because only impliedly, he terms his secondary class –as if a positive truth by definition could be either more or less positively a truth: –we will select, I say, no axiom of an unquestionability so questionable as is to be found in Euclid. We will not talk, for example, about such propositions as that two straight lines cannot enclose a space, or that the whole is greater than any one of its parts. We will afford the logician every advantage. We will come at once to a proposition which he regards as the acme of the unquestionable –as the quintessence of axiomatic undeniability. Here it is: –'Contradictions cannot both be true – that is, cannot coexist in nature.' Here Mr. Mill means, for instance, –and I give the most forcible instance conceivable –that a tree must be either a tree or not a tree –that it cannot be at the same time a tree and not a tree: –all which is quite reasonable of itself and will answer remarkably well as an axiom, until we bring it into collation with an axiom insisted upon a few pages before –in other words –words which I have previously employed –until we test it by the logic of its own propounder. 'A tree,' Mr. Mill asserts, 'must be either a tree or not a tree.' Very well: –and now let me ask him, why. To this little query there is but one response: –I defy any man living to invent a second. The sole answer is this: – 'Because we find it impossible to conceive that a tree can be anything else than a tree or not a tree.' This, I repeat, is Mr. Mill's sole answer: –he will not pretend to suggest another: –and yet, by his own showing, his answer is clearly no answer at all; for has he not already required us to admit, as an axiom, that ability or inability to conceive is in no case to be taken as a criterion of axiomatic truth? Thus all –absolutely his argumentation is at sea without a rudder. Let it not be urged that an exception from the general rule is to be made, in cases where the 'impossibility to conceive' is so peculiarly great as when we are called upon to conceive a tree both a tree and not a tree. Let no attempt, I say, be made at urging this sotticism; for, in the first place, there are no degrees of 'impossibility,' and thus no one impossible conception can be more peculiarly impossible than another impossible conception: –in the second place, Mr. Mill himself, no doubt after thorough deliberation, has most distinctly, and most rationally, excluded all opportunity for exception, by the emphasis of his proposition, that, in no case, is ability or inability to conceive, to be taken as a criterion of axiomatic truth: –in the third place, even were exceptions admissible at all, it remains to be shown how any exception is admissible here. That a tree can be both a tree and not a tree, is an idea which the angels, or the devils, may entertain, and which no doubt many an earthly Bedlamite, or Transcendentalist, does.

"Now I do not quarrel with these ancients," continues the letter-writer, "so much on account of the transparent frivolity of their logic –which, to be plain, was baseless, worthless and fantastic

altogether –as on account of their pompous and infatuate proscription of all other roads to Truth than the two narrow and crooked paths –the one of creeping and the other of crawling –to which, in their ignorant perversity, they have dared to confine the Soul –the Soul which loves nothing so well as to soar in those regions of illimitable intuition which are utterly incognizant of 'path.'

"By the bye, my dear friend, is it not an evidence of the mental slavery entailed upon those bigoted people by their Hogs and Rams, that in spite of the eternal prating of their savans about roads to Truth, none of them fell, even by accident, into what we now so distinctly perceive to be the broadest, the straightest and most available of all mere roads –the great thoroughfare –the majestic highway of the Consistent? Is it not wonderful that they should have failed to deduce from the works of God the vitally momentous consideration that a perfect consistency can be nothing but an absolute truth? How plain –how rapid our progress since the late announcement of this proposition! By its means, investigation has been taken out of the hands of the ground-moles, and given as a duty, rather than as a task, to the true –to the only true thinkers –to the generally-educated men of ardent imagination. These latter –our Keplers –our Laplaces –'speculate' –'theorize' –these are the terms – can you not fancy the shout of scorn with which they would be received by our progenitors, were it possible for them to be looking over my shoulders as I write? The Keplers, I repeat, speculate – theorize – and their theories are merely corrected –reduced –sifted – cleared, little by little, of their chaff of inconsistency –until at length there stands apparent an unencumbered Consistency –a consistency which the most stolid admit –because it is a consistency –to be an absolute and unquestionable TRuth.

"I have often thought, my friend, that it must have puzzled these dogmaticians of a thousand years ago, to determine, even, by which of their two boasted roads it is that the cryptographist attains the solution of the more complicated cyphers –or by which of them Champollion guided mankind to those important and innumerable truths which, for so many centuries, have lain entombed amid the phonetical hieroglyphics of Egypt. In especial, would it not have given these bigots some trouble to determine by which of their two roads was reached the most momentous and sublime of their truths –the truth –the fact of gravitation? Newton deduced it from the laws of Kepler. Kepler admitted that these laws he guessed –these laws whose investigation disclosed to the greatest of British astronomers that principle, the basis of all (existing) physical principle, in going behind which we enter at once the nebulous kingdom of Metaphysics. Yes! –these vital laws Kepler guessed –that it is to say, he imagined them. Had he been asked to point out either the de ductive or in ductive route by which he attained them, his reply might have been –'I know nothing about routes –but I do know the machinery of the Universe. Here it is. I grasped it with my soul –I reached it through mere dint of intuition.' Alas, poor ignorant old man! Could not any metaphysician have told him that what he called 'intuition' was but the conviction resulting from de ductions or in ductions of which the processes were so shadowy as to have escaped his consciousness, eluded his reason, or bidden defiance to his capacity of expression? How great a pity it is that some 'moral philosopher' had not enlightened him about all this! How it would have comforted him on his death-bed to know that, instead of having gone intuitively and thus unbecomingly, he had, in fact, proceeded decorously and legitimately –that is to say Hog-ishly, or at least Ram-ishly –into the vast halls where lay gleaming, untended, and hitherto untouched by mortal hand –unseen by mortal eye –the imperishable and priceless secrets of the Universe!

"Yes, Kepler was essentially a theorist; but this title, now of so much sanctity, was, in those ancient days, a designation of supreme contempt. It is only now that men begin to appreciate that divine old man –to sympathize with the prophetic and poetical rhapsody of his ever-memorable words. For my part," continues the unknown correspondent, "I glow with a sacred fire when I even think of them, and feel that I shall never grow weary of their repetition: – in concluding this letter, let me have the real pleasure of transcribing them once again: –'I care not whether my work be read now or by posterity. I can afford to wait a century for readers when God himself has waited six thousand

years for an observer. I triumph. I have stolen the golden secret of the Egyptians. I will indulge my sacred fury."

Here end my quotations from this very unaccountable and, perhaps, somewhat impertinent epistle; and perhaps it would be folly to comment, in any respect, upon the chimerical, not to say revolutionary, fancies of the writer –whoever he is –fancies so radically at war with the well-considered and well-settled opinions of this age. Let us proceed, then, to our legitimate thesis, The Universe.

This thesis admits a choice between two modes of discussion: –We may ascend or descend. Beginning at our own point of view –at the Earth on which we stand –we may pass to the other planets of our system –thence to the Sun –thence to our system considered collectively –and thence, through other systems, indefinitely outwards; or, commencing on high at some point as definite as we can make it or conceive it, we may come down to the habitation of Man. Usually –that is to say, in ordinary essays on Astronomy –the first of these two modes is, with certain reservation, adopted: –this for the obvious reason that astronomical facts, merely, and principles, being the object, that object is best fulfilled in stepping from the known because proximate, gradually onward to the point where all certitude becomes lost in the remote. For my present purpose, however, –that of enabling the mind to take in, as if from afar and at one glance, a distant conception of the individual Universe –it is clear that a descent to small from great –to the outskirts from the centre (if we could establish a centre) –to the end from the beginning (if we could fancy a beginning) would be the preferable course, but for the difficulty, if not impossibility, of presenting, in this course, to the unastronomical, a picture at all comprehensible in regard to such considerations as are involved in quantity –that is to say, in number, magnitude and distance.

Now, distinctness –intelligibility, at all points, is a primary feature in my general design. On important topics it is better to be a good deal prolix than even a very little obscure. But abstruseness is a quality appertaining to no subject per se. All are alike, in facility of comprehension, to him who approaches them by properly graduated steps. It is merely because a stepping-stone, here and there, is heedlessly left unsupplied in our road to the Differential Calculus, that this latter is not altogether as simple a thing as a sonnet by Mr. Solomon Seesaw.

By way of admitting, then, no chance for misapprehension, I think it advisable to proceed as if even the more obvious facts of Astronomy were unknown to the reader. In combining the two modes of discussion to which I have referred, I propose to avail myself of the advantages peculiar to each – and very especially of the iteration in detail which will be unavoidable as a consequence of the plan. Commencing with a descent, I shall reserve for the return upwards those indispensable considerations of quantity to which allusion has already been made.

Let us begin, then, at once, with that merest of words, "Infinity." This, like "God," "spirit," and some other expressions of which the equivalents exist in all languages, is by no means the expression of an idea –but of an effort at one. It stands for the possible attempt at an impossible conception. Man needed a term by which to point out the direction of this effort –the cloud behind which lay, forever invisible, the object of this attempt. A word, in fine, was demanded, by means of which one human being might put himself in relation at once with another human being and with a certain tendency of the human intellect. Out of this demand arose the word, "Infinity;" which is thus the representative but of the thought of a thought.

As regards that infinity now considered –the infinity of space –we often hear it said that "its idea is admitted by the mind –is acquiesced in –is entertained –on account of the greater difficulty which attends the conception of a limit." But this is merely one of those phrases by which even profound thinkers, time out of mind, have occasionally taken pleasure in deceiving themselves. The quibble lies concealed in the word "difficulty." "The mind," we are told, "entertains the idea of limitless, through the greater difficulty which it finds in entertaining that of limited, space." Now, were the proposition but fairly put, its absurdity would become transparent at once. Clearly, there is no mere difficulty in

the case. The assertion intended, if presented according to its intention and without sophistry, would run thus:—"The mind admits the idea of limitless, through the greater impossibility of entertaining that of limited, space."

It must be immediately seen that this is not a question of two statements between whose respective credibilities—or of two arguments between whose respective validities—the reason is called upon to decide:—it is a matter of two conceptions, directly conflicting, and each avowedly impossible, one of which the intellect is supposed to be capable of entertaining, on account of the greater impossibility of entertaining the other. The choice is not made between two difficulties;—it is merely fancied to be made between two impossibilities. Now of the former, there are degrees,—but of the latter, none:—just as our impertinent letter-writer has already suggested. A task may be more or less difficult; but it is either possible or not possible:—there are no gradations. It might be more difficult to overthrow the Andes than an ant-hill; but it can be no more impossible to annihilate the matter of the one than the matter of the other. A man may jump ten feet with less difficulty than he can jump twenty, but the impossibility of his leaping to the moon is not a whit less than that of his leaping to the dog-star.

Since all this is undeniable: since the choice of the mind is to be made between impossibilities of conception: since one impossibility cannot be greater than another: and since, thus, one cannot be preferred to another: the philosophers who not only maintain, on the grounds mentioned, man's idea of infinity but, on account of such supposititious idea, infinity itself—are plainly engaged in demonstrating one impossible thing to be possible by showing how it is that some one other thing—is impossible too. This, it will be said, is nonsense; and perhaps it is:—indeed I think it very capital nonsense—but forego all claim to it as nonsense of mine.

The readiest mode, however, of displaying the fallacy of the philosophical argument on this question, is by simply adverting to a fact respecting it which has been hitherto quite overlooked—the fact that the argument alluded to both proves and disproves its own proposition. "The mind is impelled," say the theologians and others, "to admit a First Cause, by the superior difficulty it experiences in conceiving cause beyond cause without end." The quibble, as before, lies in the word "difficulty"—but here what is it employed to sustain? A First Cause. And what is a First Cause? An ultimate termination of causes. And what is an ultimate termination of causes? Finiteness—the Finite. Thus the one quibble, in two processes, by God knows how many philosophers, is made to support now Finiteness and now Infinity—could it not be brought to support something besides? As for the quibblers—they, at least, are insupportable. But—to dismiss them:—what they prove in the one case is the identical nothing which they demonstrate in the other.

Of course, no one will suppose that I here contend for the absolute impossibility of that which we attempt to convey in the word "Infinity." My purpose is but to show the folly of endeavoring to prove Infinity itself, or even our conception of it, by any such blundering ratiocination as that which is ordinarily employed.

Nevertheless, as an individual, I may be permitted to say that I cannot conceive Infinity, and am convinced that no human being can. A mind not thoroughly self-conscious—not accustomed to the introspective analysis of its own operations—will, it is true, often deceive itself by supposing that it has entertained the conception of which we speak. In the effort to entertain it, we proceed step beyond step—we fancy point still beyond point; and so long as we Continue the effort, it may be said, in fact, that we are tending to the formation of the idea designed; while the strength of the impression that we actually form or have formed it, is in the ratio of the period during which we keep up the mental endeavor. But it is in the act of discontinuing the endeavor—of fulfilling (as we think) the idea—of putting the finishing stroke (as we suppose) to the conception—that we overthrow at once the whole fabric of our fancy by resting upon some one ultimate and therefore definite point. This fact, however, we fail to perceive, on account of the absolute coincidence, in time, between the settling down upon

the ultimate point and the act of cessation in thinking. –In attempting, on the other hand, to frame the idea of a limited space, we merely converse the processes which involve the impossibility.

We believe in a God. We may or may not believe in finite or in infinite space; but our belief, in such cases, is more properly designated as faith, and is a matter quite distinct from that belief proper –from that intellectual belief –which presupposes the mental conception.

The fact is, that, upon the enunciation of any one of that class of terms to which "Infinity" belongs –the class representing thoughts of thought –he who has a right to say that he thinks at all, feels himself called upon, not to entertain a conception, but simply to direct his mental vision toward some given point, in the intellectual firmament, where lies a nebula never to be resolved. To solve it, indeed, he makes no effort; for with a rapid instinct he comprehends, not only the impossibility, but, as regards all human purposes, the inessentiality, of its solution. He perceives that the Deity has not designed it to be solved. He sees, at once, that it lies out of the brain of man, and even how, if not exactly why, it lies out of it. There are people, I am aware, who, busying themselves in attempts at the unattainable, acquire very easily, by dint of the jargon they emit, among those thinkers-that-they-think with whom darkness and depth are synonymous, a kind of cuttle-fish reputation for profundity; but the finest quality of Thought is its self-cognizance; and, with some little equivocation, it may be said that no fog of the mind can well be greater than that which, extending to the very boundaries of the mental domain, shuts out even these boundaries themselves from comprehension.

It will now be understood that, in using the phrase, "Infinity of Space," I make no call upon the reader to entertain the impossible conception of an absolute infinity. I refer simply to the "utmost conceivable expanse" of space –a shadowy and fluctuating domain, now shrinking, now swelling, in accordance with the vacillating energies of the imagination.

Hitherto, the Universe of stars has always been considered as coincident with the Universe proper, as I have defined it in the commencement of this Discourse. It has been always either directly or indirectly assumed –at least since the dawn of intelligible Astronomy –that, were it possible for us to attain any given point in space, we should still find, on all sides of us, an interminable succession of stars. This was the untenable idea of Pascal when making perhaps the most successful attempt ever made, at paraphrasing the conception for which we struggle in the word "Universe." "It is a sphere," he says, "of which the centre is everywhere, the circumference, nowhere." But although this intended definition is, in fact, no definition of the Universe of stars, we may accept it, with some mental reservation, as a definition (rigorous enough for all practical purposes) of the Universe proper – that is to say, of the Universe of space. This latter, then, let us regard as "a sphere of which the centre is everywhere, the circumference nowhere." In fact, while we find it impossible to fancy an end to space, we have no difficulty in picturing to ourselves any one of an infinity of beginnings.

As our starting point, then, let us adopt the Godhead. Of this Godhead, in itself, he alone is not imbecile –he alone is not impious who propounds –nothing. "Nous ne connaissons rien," says the Baron de Bielfeld –"Nous ne connaissons rien de la nature ou de l'essence de Dieu: –pour savoir ce qu'il est, il faut etre Dieu meme." – "We know absolutely nothing of the nature or essence of God: – in order to comprehend what he is, we should have to be God ourselves."

"We should have to be God ourselves!" –With a phrase so startling as this yet ringing in my ears, I nevertheless venture to demand if this our present ignorance of the Deity is an ignorance to which the soul is everlastingly condemned.

By Him, however –now, at least, the Incomprehensible –by Him – assuming him as Spirit – that is to say, as not Matter –a distinction which, for all intelligible purposes, will stand well instead of a definition –by Him, then, existing as Spirit, let us content ourselves, to-night, with supposing to have been created, or made out of Nothing, by dint of his Volition –at some point of Space which we will take as a centre –at some period into which we do not pretend to inquire, but at all events immensely remote –by Him, then again, let us suppose to have been created –what? This is a vitally

momentous epoch in our considerations. What is it that we are justified –that alone we are justified in supposing to have been, primarily and solely, created?

We have attained a point where only Intuition can aid us: –but now let me recur to the idea which I have already suggested as that alone which we can properly entertain of intuition. It is but the conviction arising from those inductions or deductions of which the processes are so shadowy as to escape our consciousness, elude our reason, or defy our capacity of expression. With this understanding, I now assert –that an intuition altogether irresistible, although inexpressible, forces me to the conclusion that what God originally created –that that Matter which, by dint of his Volition, he first made from his Spirit, or from Nihilism, Could have been nothing but Matter in its utmost conceivable state of – what? –of Simplicity?

This will be found the sole absolute assumption of my Discourse. I use the word "assumption" in its ordinary sense; yet I maintain that even this my primary proposition, is very, very far indeed, from being really a mere assumption. Nothing was ever more certainly – no human conclusion was ever, in fact, more regularly –more rigorously deduced: –but, alas! the processes lie out of the human analysis –at all events are beyond the utterance of the human tongue.

Let us now endeavor to conceive what Matter must be, when, or if, in its absolute extreme of Simplicity. Here the Reason flies at once to Impartiality –to a particle –to one particle –a particle of one kind – of one character –of one nature –of one size –of one form – a particle, therefore, "without form and void" –a particle positively a particle at all points –a particle absolutely unique, individual, undivided, and not indivisible only because He who created it, by dint of his Will, can by an infinitely less energetic exercise of the same Will, as a matter of course, divide it.

Oneness, then, is all that I predicate of the originally created Matter; but I propose to show that this Oneness is a principle abundantly sufficient to account for the constitution, the existing phenomena and the plainly inevitable annihilation of at least the material Universe.

The willing into being the primordial particle, has completed the act, or more properly the Conception, of Creation. We now proceed to the ultimate purpose for which we are to suppose the Particle created – that is to say, the ultimate purpose so far as our considerations yet enable us to see it –the constitution of the Universe from it, the Particle.

This constitution has been effected by forcing the originally and therefore normally One into the abnormal condition of Many. An action of this character implies reaction. A diffusion from Unity, under the conditions, involves a tendency to return into Unity –a tendency ineradicable until satisfied. But on these points I will speak more fully hereafter.

The assumption of absolute Unity in the primordial Particle includes that of infinite divisibility. Let us conceive the Particle, then, to be only not totally exhausted by diffusion into Space. From the one Particle, as a centre, let us suppose to be irradiated spherically –in all directions –to immeasurable but still to definite distances in the previously vacant space –a certain inexpressibly great yet limited number of unimaginably yet not infinitely minute atoms.

Now, of these atoms, thus diffused, or upon diffusion, what conditions are we permitted –not to assume, but to infer, from consideration as well of their source as of the character of the design apparent in their diffusion? Unity being their source, and difference from Unity the character of the design manifested in their diffusion, we are warranted in supposing this character to be at least generally preserved throughout the design, and to form a portion of the design itself: –that is to say, we shall be warranted in conceiving continual differences at all points from the unicity and simplicity of the origin. But, for these reasons, shall we be justified in imagining the atoms heterogeneous, dissimilar, unequal, and inequidistant? More explicitly –are we to consider no two atoms as, at their diffusion, of the same nature, or of the same form, or of the same size? –and, after fulfilment of their diffusion into Space, is absolute inequidistance, each from each, to be understood of all of them? In such arrangement, under such conditions, we most easily and immediately comprehend the subsequent most feasible carrying out to completion of any such design as that which I have suggested

–the design of variety out of unity –diversity out of sameness – heterogeneity out of homogeneity –complexity out of simplicity –in a word, the utmost possible multiplicity of relation out of the emphatically irrelative One. Undoubtedly, therefore, we should be warranted in assuming all that has been mentioned, but for the reflection, first, that supererogation is not presumable of any Divine Act; and, secondly, that the object supposed in view, appears as feasible when some of the conditions in question are dispensed with, in the beginning, as when all are understood immediately to exist. I mean to say that some are involved in the rest, or so instantaneous a consequence of them as to make the distinction inappreciable. Difference of size, for example, will at once be brought about through the tendency of one atom to a second, in preference to a third, on account of particular inequidistance; which is to be comprehended as particular inequidistances between centres of quantity, in neighboring atoms of different form –a matter not at all interfering with the generally-equable distribution of the atoms. Difference of kind, too, is easily conceived to be merely a result of differences in size and form, taken more or less conjointly: –in fact, since the Unity of the Particle Proper implies absolute homogeneity, we cannot imagine the atoms, at their diffusion, differing in kind, without imagining, at the same time, a special exercise of the Divine Will, at the emission of each atom, for the purpose of effecting, in each, a change of its essential nature: –so fantastic an idea is the less to be indulged, as the object proposed is seen to be thoroughly attainable without such minute and elaborate interposition. We perceive, therefore, upon the whole, that it would be supererogatory, and consequently unphilosophical, to predicate of the atoms, in view of their purposes, any thing more than difference of form at their dispersion, with particular inequidistance after it –all other differences arising at once out of these, in the very first processes of mass-constitution: –We thus establish the Universe on a purely geometrical basis. Of course, it is by no means necessary to assume absolute difference, even of form, among the atoms irradiated –any more than absolute particular inequidistance of each from each. We are required to conceive merely that no neighboring atoms are of similar form –no atoms which can ever approximate, until their inevitable reunion at the end.

Although the immediate and perpetual tendency of the disunited atoms to return into their normal Unity, is implied, as I have said, in their abnormal diffusion; still it is clear that this tendency will be without consequence –a tendency and no more –until the diffusive energy, in ceasing to be exerted, shall leave it, the tendency, free to seek its satisfaction. The Divine Act, however, being considered as determinate, and discontinued on fulfilment of the diffusion, we understand, at once, a reaction –in other words, a satisfiable tendency of the disunited atoms to return into One.

But the diffusive energy being withdrawn, and the reaction having commenced in furtherance of the ultimate design –that of the utmost possible Relation –this design is now in danger of being frustrated, in detail, by reason of that very tendency to return which is to effect its accomplishment in general. Multiplicity is the object; but there is nothing to prevent proximate atoms, from lapsing at once, through the now satisfiable tendency –before the fulfilment of any ends proposed in multiplicity –into absolute oneness among themselves: – there is nothing to impede the aggregation of various unique masses, at various points of space: – in other words, nothing to interfere with the accumulation of various masses, each absolutely One.

For the effectual and thorough completion of the general design, we thus see the necessity for a repulsion of limited capacity –a separate something which, on withdrawal of the diffusive Volition, shall at the same time allow the approach, and forbid the junction, of the atoms; suffering them infinitely to approximate, while denying them positive contact; in a word, having the power –up to a certain epoch –of preventing their Coalition, but no ability to interfere with their Coalescence in any respect or degree. The repulsion, already considered as so peculiarly limited in other regards, must be understood, let me repeat, as having power to prevent absolute coalition, only up to a certain epoch. Unless we are to conceive that the appetite for Unity among the atoms is doomed to be satisfied never; –unless we are to conceive that what had a beginning is to have no end –a conception which cannot really be entertained, however much we may talk or dream of entertaining it – we are forced

to conclude that the repulsive influence imagined, will, finally –under pressure of the Uni-tendency collectively applied, but, never and in no degree until, on fulfilment of the Divine purposes, such collective application shall be naturally made –yield to a force which, at that ultimate epoch, shall be the superior force precisely to the extent required, and thus permit the universal subsidence into the inevitable, because original and therefore normal, One. –The conditions here to be reconciled are difficult indeed: –we cannot even comprehend the possibility of their conciliation; –nevertheless, the apparent impossibility is brilliantly suggestive.

That the repulsive something actually exists, we see. Man neither employs, nor knows, a force sufficient to bring two atoms into contact. This is but the well-established proposition of the impenetrability of matter. All Experiment proves –all Philosophy admits it. The design of the repulsion –the necessity for its existence –I have endeavored to show; but from all attempt at investigating its nature have religiously abstained; this on account of an intuitive conviction that the principle at issue is strictly spiritual –lies in a recess impervious to our present understanding – lies involved in a consideration of what now –in our human state –is not to be considered –in a consideration of Spirit in itself. I feel, in a word, that here the God has interposed, and here only, because here and here only the knot demanded the interposition of the God.

In fact, while the tendency of the diffused atoms to return into Unity, will be recognized, at once, as the principle of the Newtonian Gravity, what I have spoken of as a repulsive influence prescribing limits to the (immediate) satisfaction of the tendency, will be understood as that which we have been in the practice of designating now as heat, now as magnetism, now as electricity; displaying our ignorance of its awful character in the vacillation of the phraseology with which we endeavor to circumscribe it.

Calling it, merely for the moment, electricity, we know that all experimental analysis of electricity has given, as an ultimate result, the principle, or seeming principle, heterogeneity. Only where things differ is electricity apparent; and it is presumable that they never differ where it is not developed at least, if not apparent. Now, this result is in the fullest keeping with that which I have reached unempirically. The design of the repulsive influence I have maintained to be that of preventing immediate Unity among the diffused atoms; and these atoms are represented as different each from each. Difference is their character –their essentiality –just as no-difference was the essentiality of their course. When we say, then, that an attempt to bring any two of these atoms together would induce an effort, on the part of the repulsive influence, to prevent the contact we may as well use the strictly convertible sentence that an attempt to bring together any two differences will result in a development of electricity. All existing bodies, of course, are composed of these atoms in proximate contact, and are therefore to be considered as mere assemblages of more or fewer differences; and the resistance made by the repulsive spirit, on bringing together any two such assemblages, would be in the ratio of the two sums of the differences in each: –an expression which, when reduced, is equivalent to this: –The amount of electricity developed on the approximation of two bodies, is proportional to the difference between the respective sums of the atoms of which the bodies are composed. That no two bodies are absolutely alike, is a simple corollary from all that has been here said. Electricity, therefore, existing always, is developed whenever any bodies, but manifested only when bodies of appreciable difference, are brought into approximation.

To electricity –so, for the present, continuing to call it –we may not be wrong in referring the various physical appearances of light, heat and magnetism; but far less shall we be liable to err in attributing to this strictly spiritual principle the more important phaenomena of vitality, consciousness and Thought. On this topic, however, I need pause here merely to suggest that these phaenomena, whether observed generally or in detail, seem to proceed at least in the ratio of the heterogeneous.

Discarding now the two equivocal terms, "gravitation" and "electricity," let us adopt the more definite expressions, "attraction" and "repulsion." The former is the body; the latter the soul: the one is the material; the other the spiritual, principle of the Universe. No other principles exist. All

phenomena are referable to one, or to the other, or to both combined. So rigorously is this the case – so thoroughly demonstrable is it that attraction and repulsion are the sole properties through which we perceive the Universe –in other words, by which Matter is manifested to Mind –that, for all merely argumentative purposes, we are fully justified in assuming that matter exists only as attraction and repulsion –that attraction and repulsion are matter: –there being no conceivable case in which we may not employ the term "matter" and the terms "attraction" and "repulsion," taken together, as equivalent, and therefore convertible, expressions in Logic.

I said, just now, that what I have described as the tendency of the diffused atoms to return into their original unity, would be understood as the principle of the Newtonian law of gravity: and, in fact, there can be but little difficulty in such an understanding, if we look at the Newtonian gravity in a merely general view, as a force impelling matter to seek matter; that is to say, when we pay no attention to the known *modus operandi* of the Newtonian force. The general coincidence satisfies us; but, upon looking closely, we see, in detail, much that appears in coincident, and much in regard to which no coincidence, at least, is established. For example; the Newtonian gravity, when we think of it in certain moods, does not seem to be a tendency to oneness at all, but rather a tendency of all bodies in all directions –a phrase apparently expressive of a tendency to diffusion. Here, then, is an in coincidence. Again; when we reflect on the mathematical LA0 governing the Newtonian tendency, we see clearly that no coincidence has been made good, in respect of the *modus operandi*, at least, between gravitation as known to exist and that seemingly simple and direct tendency which I have assumed.

In fact, I have attained a point at which it will be advisable to strengthen my position by reversing my processes. So far, we have gone on a priori, from an abstract consideration of Simplicity, as that quality most likely to have characterized the original action of God. Let us now see whether the established facts of the Newtonian Gravitation may not afford us, a posteriori, some legitimate inductions.

What does the Newtonian law declare? –That all bodies attract each other with forces proportional to their quantities of matter and inversely proportional to the squares of their distances. Purposely, I have here given, in the first place, the vulgar version of the law; and I confess that in this, as in most other vulgar versions of great truths, we find little of a suggestive character. Let us now adopt a more philosophical phraseology: –Every atom, of every body, attracts every other atom, both of its own and of every other body, with a force which varies inversely as the squares of the distances between the attracting and attracted atom. –Here, indeed, a flood of suggestion bursts upon the mind.

But let us see distinctly what it was that Newton proved – according to the grossly irrational definitions of proof prescribed by the metaphysical schools. He was forced to content himself with showing how thoroughly the motions of an imaginary Universe, composed of attracting and attracted atoms obedient to the law he announced, coincide with those of the actually existing Universe so far as it comes under our observation. This was the amount of his demonstration –that is to say, this was the amount of it, according to the conventional cant of the "philosophies." His successes added proof multiplied by proof –such proof as a sound intellect admits – but the demonstration of the law itself, persist the metaphysicians, had not been strengthened in any degree. "Ocular, physical proof," however, of attraction, here upon Earth, in accordance with the Newtonian theory, was, at length, much to the satisfaction of some intellectual grovellers, afforded. This proof arose collaterally and incidentally (as nearly all important truths have arisen) out of an attempt to ascertain the mean density of the Earth. In the famous Maskelyne, Cavendish and Bailly experiments for this purpose, the attraction of the mass of a mountain was seen, felt, measured, and found to be mathematically consistent with the immortal theory of the British astronomer.

But in spite of this confirmation of that which needed none –in spite of the so-called corroboration of the "theory" by the so-called "ocular and physical proof" –in spite of the character of this corroboration – the ideas which even really philosophical men cannot help imbibing of gravity

—and, especially, the ideas of it which ordinary men get and contentedly maintain, are seen to have been derived, for the most part, from a consideration of the principle as they find it developed — merely in the planet upon which they stand.

Now, to what does so partial a consideration tend —to what species of error does it give rise? On the Earth we see and feel, only that gravity impels all bodies towards the centre of the Earth. No man in the common walks of life could be made to see or feel anything else — could be made to perceive that anything, anywhere, has a perpetual, gravitating tendency in any other direction than to the centre of the Earth; yet (with an exception hereafter to be specified) it is a fact that every earthly thing (not to speak now of every heavenly thing) has a tendency not only to the Earth's centre but in every conceivable direction besides.

Now, although the philosophic cannot be said to err with the vulgar in this matter, they nevertheless permit themselves to be influenced, without knowing it, by the sentiment of the vulgar idea. "Although the Pagan fables are not believed," says Bryant, in his very erudite "Mythology," "yet we forget ourselves continually and make inferences from them as from existing realities." I mean to assert that the merely sensitive perception of gravity as we experience it on Earth, beguiles mankind into the fancy of Concentralization or especiality respecting it —has been continually biasing towards this fancy even the mightiest intellects —perpetually, although imperceptibly, leading them away from the real characteristics of the principle; thus preventing them, up to this date, from ever getting a glimpse of that vital truth which lies in a diametrically opposite direction —behind the principle's essential characteristics —those, not of centralization or especiality —but of universality and diffusion. This "vital truth" is Unity as the source of the phaenomenon.

Let me now repeat the definition of gravity: —Every atom, of every body, attracts every other atom, both of its own and of every other body, with a force which varies inversely as the squares of the distances of the attracting and attracted atom.

Here let the reader pause with me, for a moment, in contemplation of the miraculous —of the ineffable —of the altogether unimaginable complexity of relation involved in the fact that each atom attracts every other atom —involved merely in this fact of the attraction, without reference to the law or mode in which the attraction is manifested —involved merely in the fact that each atom attracts every other atom at all, in a wilderness of atoms so numerous that those which go to the composition of a cannon-ball, exceed, probably, in mere point of number, all the stars which go to the constitution of the Universe.

Had we discovered, simply, that each atom tended to some one favorite point —to some especially attractive atom —we should still have fallen upon a discovery which, in itself, would have sufficed to overwhelm the mind: —but what is it that we are actually called upon to comprehend? That each atom attracts —sympathizes with the most delicate movements of every other atom, and with each and with all at the same time, and forever, and according to a determinate law of which the complexity, even considered by itself solely, is utterly beyond the grasp of the imagination of man. If I propose to ascertain the influence of one mote in a sunbeam upon its neighboring mote, I cannot accomplish my purpose without first counting and weighing all the atoms in the Universe and defining the precise positions of all at one particular moment. If I venture to displace, by even the billionth part of an inch, the microscopical speck of dust which lies now upon the point of my finger, what is the character of that act upon which I have adventured? I have done a deed which shakes the Moon in her path, which causes the Sun to be no longer the Sun, and which alters forever the destiny of the multitudinous myriads of stars that roll and glow in the majestic presence of their Creator.

These ideas —conceptions such as these —unthought-like thoughts — soul-reveries rather than conclusions or even considerations of the intellect: —ideas, I repeat, such as these, are such as we can alone hope profitably to entertain in any effort at grasping the great principle, Attraction.

But now, –with such ideas –with such a vision of the marvellous complexity of Attraction fairly in his mind –let any person competent of thought on such topics as these, set himself to the task of imagining a principle for the phaenomena observed –a condition from which they sprang.

Does not so evident a brotherhood among the atoms point to a common parentage? Does not a sympathy so omniprevalent, so ineradicable, and so thoroughly irrespective, suggest a common paternity as its source? Does not one extreme impel the reason to the other? Does not the infinitude of division refer to the utterness of individuality? Does not the entireness of the complex hint at the perfection of the simple? It is not that the atoms, as we see them, are divided or that they are complex in their relations –but that they are inconceivably divided and unutterably complex: –it is the extremeness of the conditions to which I now allude, rather than to the conditions themselves. In a word, not because the atoms were, at some remote epoch of time, even more than together –is it not because originally, and therefore normally, they were One –that now, in all circumstances –at all points –in all directions –by all modes of approach –in all relations and through all conditions –they struggle back to this absolutely, this irrelatively, this unconditionally one?

Some person may here demand: –"Why –since it is to the One that the atoms struggle back – do we not find and define Attraction 'a merely general tendency to a centre?' –why, in especial, do not your atoms –the atoms which you describe as having been irradiated from a centre –proceed at once, rectilinearly, back to the central point of their origin?"

I reply that they do; as will be distinctly shown; but that the cause of their so doing is quite irrespective of the centre as such. They all tend rectilinearly towards a centre, because of the sphericity with which they have been irradiated into space. Each atom, forming one of a generally uniform globe of atoms, finds more atoms in the direction of the centre, of course, than in any other, and in that direction, therefore, is impelled –but is not thus impelled because the centre is the point of its origin. It is not to any point that the atoms are allied. It is not any locality, either in the concrete or in the abstract, to which I suppose them bound. Nothing like location was conceived as their origin. Their source lies in the principle, Unity. This is their lost parent. This they seek always –immediately –in all directions – wherever it is even partially to be found; thus appeasing, in some measure, the ineradicable tendency, while on the way to its absolute satisfaction in the end. It follows from all this, that any principle which shall be adequate to account for the LA0 or *modus operandi*, of the attractive force in general, will account for this law in particular: – that is to say, any principle which will show why the atoms should tend to their general centre of irradiation with forces inversely proportional to the squares of the distances, will be admitted as satisfactorily accounting, at the same time, for the tendency, according to the same law, of these atoms each to each: – for the tendency to the centre is merely the tendency each to each, and not any tendency to a centre as such. –Thus it will be seen, also, that the establishment of my propositions would involve no necessity of modification in the terms of the Newtonian definition of Gravity, which declares that each atom attracts each other atom and so forth, and declares this merely; but (always under the supposition that what I propose be, in the end, admitted) it seems clear that some error might occasionally be avoided, in the future processes of Science, were a more ample phraseology adopted: –for instance: – "Each atom tends to every other atom &c. with a force &c.: the general result being a tendency of all, with a similar force, to a general centre."

The reversal of our processes has thus brought us to an identical result; but, while in the one process intuition was the starting-point, in the other it was the goal. In commencing the former journey I could only say that, with an irresistible intuition, I felt Simplicity to have been the characteristic of the original action of God: –in ending the latter I can only declare that, with an irresistible intuition, I perceive Unity to have been the source of the observed phaenomena of the Newtonian gravitation. Thus, according to the schools, I prove nothing. So be it: –I design but to suggest-and to Convince through the suggestion. I am proudly aware that there exist many of the most profound and cautiously discriminative human intellects which cannot help being abundantly content with my –suggestions.

To these intellects –as to my own –there is no mathematical demonstration which Could bring the least additional TRue proof of the great TRuth which I have advanced – the truth of Original Unity as the source –as the principle of the Universal Phaenomena. For my part, I am not sure that I speak and see –I am not so sure that my heart beats and that my soul lives: – of the rising of to-morrow's sun –a probability that as yet lies in the Future –I do not pretend to be one thousandth part as sure – as I am of the irretrievably by-gone Fact that All Things and All Thoughts of Things, with all their ineffable Multiplicity of Relation, sprang at once into being from the primordial and irrelative One.

Referring to the Newtonian Gravity, Dr. Nichol, the eloquent author of "The Architecture of the Heavens," says: –"In truth we have no reason to suppose this great Law, as now revealed, to be the ultimate or simplest, and therefore the universal and all-comprehensive, form of a great Ordinance. The mode in which its intensity diminishes with the element of distance, has not the aspect of an ultimate principle; which always assumes the simplicity and self-evidence of those axioms which constitute the basis of Geometry."

Now, it is quite true that "ultimate principles," in the common understanding of the words, always assume the simplicity of geometrical axioms –(as for "self-evidence," there is no such thing) – but these principles are clearly not "ultimate;" in other terms what we are in the habit of calling principles are no principles, properly speaking –since there can be but one principle, the Volition of God. We have no right to assume, then, from what we observe in rules that we choose foolishly to name "principles," anything at all in respect to the characteristics of a principle proper. The "ultimate principles" of which Dr. Nichol speaks as having geometrical simplicity, may and do have this geometrical turn, as being part and parcel of a vast geometrical system, and thus a system of simplicity itself –in which, nevertheless, the TRuly ultimate principle is, as we know, the consummation of the complex –that is to say, of the unintelligible –for is it not the Spiritual Capacity of God?

I quoted Dr. Nichol's remark, however, not so much to question its philosophy, as by way of calling attention to the fact that, while all men have admitted some principle as existing behind the Law of Gravity, no attempt has been yet made to point out what this principle in particular is: – if we except, perhaps, occasional fantastic efforts at referring it to Magnetism, or Mesmerism, or Swedenborgianism, or Transcendentalism, or some other equally delicious ism of the same species, and invariably patronized by one and the same species of people. The great mind of Newton, while boldly grasping the Law itself, shrank from the principle of the Law. The more fluent and comprehensive at least, if not the more patient and profound, sagacity of Laplace, had not the courage to attack it. But hesitation on the part of these two astronomers it is, perhaps, not so very difficult to understand. They, as well as all the first class of mathematicians, were mathematicians solely: – their intellect, at least, had a firmly-pronounced mathematico-physical tone. What lay not distinctly within the domain of Physics, or of Mathematics, seemed to them either Non-Entity or Shadow. Nevertheless, we may well wonder that Leibnitz, who was a marked exception to the general rule in these respects, and whose mental temperament was a singular admixture of the mathematical with the physico-metaphysical, did not at once investigate and establish the point at issue. Either Newton or Laplace, seeking a principle and discovering none physical, would have rested contentedly in the conclusion that there was absolutely none; but it is almost impossible to fancy, of Leibnitz, that, having exhausted in his search the physical dominions, he would not have stepped at once, boldly and hopefully, amid his old familiar haunts in the kingdom of Metaphysics. Here, indeed, it is clear that he must have adventured in search of the treasure: –that he did not find it after all, was, perhaps, because his fairy guide, Imagination, was not sufficiently well-grown, or well-educated, to direct him aright.

I observed, just now, that, in fact, there had been certain vague attempts at referring Gravity to some very uncertain isms. These attempts, however, although considered bold and justly so considered, looked no farther than to the generality –the merest generality –of the Newtonian Law. Its modus operandi has never, to my knowledge, been approached in the way of an effort at explanation. It is, therefore, with no unwarranted fear of being taken for a madman at the outset, and before I can

bring my propositions fairly to the eye of those who alone are competent to decide upon them, that I here declare the modus operandi of the Law of Gravity to be an exceedingly simple and perfectly explicable thing –that is to say, when we make our advances towards it in just gradations and in the true direction –when we regard it from the proper point of view.

Whether we reach the idea of absolute Unity as the source of All Things, from a consideration of Simplicity as the most probable characteristic of the original action of God; –whether we arrive at it from an inspection of the universality of relation in the gravitating phaenomena; –or whether we attain it as a result of the mutual corroboration afforded by both processes; –still, the idea itself, if entertained at all, is entertained in inseparable connection with another idea –that of the condition of the Universe of stars as we now perceive it –that is to say, a condition of immeasurable diffusion through space. Now a connection between these two ideas –unity and diffusion –cannot be established unless through the entertainment of a third idea –that of irradiation. Absolute Unity being taken as a centre, then the existing Universe of stars is the result of irradiation from that centre.

Now, the laws of irradiation are known. They are part and parcel of the sphere. They belong to the class of indisputable geometrical properties. We say of them, "they are true –they are evident." To demand why they are true, would be to demand why the axioms are true upon which their demonstration is based. Nothing is demonstrable, strictly speaking; but if anything be, then the properties –the laws in question are demonstrated.

But these laws –what do they declare? Irradiation –how –by what steps does it proceed outwardly from a centre?

From a luminous centre, Light issues by irradiation; and the quantities of light received upon any given plane, supposed to be shifting its position so as to be now nearer the centre and now farther from it, will be diminished in the same proportion as the squares of the distances of the plane from the luminous body, are increased; and will be increased in the same proportion as these squares are diminished.

The expression of the law may be thus generalized: –the number of light-particles (or, if the phrase be preferred, the number of light-impressions) received upon the shifting plane, will be inversely proportional with the squares of the distances of the plane. Generalizing yet again, we may say that the diffusion –the scattering –the irradiation, in a word –is directly proportional with the squares of the distances.

For example: at the distance B, from the luminous centre A, a certain number of particles are so diffused as to occupy the surface B (see illustration). Then at double the distance –that is to say at C –they will be so much farther diffused as to occupy four such surfaces: –at treble the distance, or at D, they will be so much farther separated as to occupy nine such surfaces: –while, at quadruple the distance, or at E, they will have become so scattered as to spread themselves over sixteen such surfaces –and so on forever.

In saying, generally, that the irradiation proceeds in direct proportion with the squares of the distances, we use the term irradiation to express the degree of the diffusion as we proceed outwardly from the centre. Conversing the idea, and employing the word "centralization" to express the degree of the drawing together as we come back toward the centre from an outward position, we may say that centralization proceeds inversely as the squares of the distances. In other words, we have reached the conclusion that, on the hypothesis that matter was originally irradiated from a centre and is now returning to it, the centralization, in the return, proceeds exactly as we know the force of gravitation to proceed.

Now here, if we could be permitted to assume that centralization exactly represented the force of the tendency to the centre –that the one was exactly proportional to the other, and that the two proceeded together –we should have shown all that is required. The sole difficulty existing, then, is to establish a direct proportion between "centralization" and the force of centralization; and this is done, of course, if we establish such proportion between "irradiation" and the force of irradiation.

A very slight inspection of the Heavens assures us that the stars have a certain general uniformity, equability, or equidistance, of distribution through that region of space in which, collectively, and in a roughly globular form, they are situated: –this species of very general, rather than absolute, equability, being in full keeping with my deduction of inequidistance, within certain limits, among the originally diffused atoms, as a corollary from the evident design of infinite complexity of relation out of irrelation. I started, it will be remembered, with the idea of a generally uniform but particularly un uniform distribution of the atoms; –an idea, I repeat, which an inspection of the stars, as they exist, confirms.

But even in the merely general equability of distribution, as regards the atoms, there appears a difficulty which, no doubt, has already suggested itself to those among my readers who have borne in mind that I suppose this equability of distribution effected through irradiation from a centre. The very first glance at the idea, irradiation, forces us to the entertainment of the hitherto unseparated and seemingly inseparable idea of agglomeration about a centre, with dispersion as we recede from it –the idea, in a word, of in equability of distribution in respect to the matter irradiated.

Now, I have elsewhere¹ observed that it is by just such difficulties as the one now in question –such roughnesses –such peculiarities –such protuberances above the plane of the ordinary – that Reason feels her way, if at all, in her search for the True. By the difficulty –the "peculiarity" – now presented, I leap at once to the secret –a secret which I might never have attained but for the peculiarity and the inferences which, in its mere character of peculiarity, it affords me.

The process of thought, at this point, may be thus roughly sketched: –I say to myself –"Unity, as I have explained it, is a truth –I feel it. Diffusion is a truth –I see it. Irradiation, by which alone these two truths are reconciled, is a consequent truth – I perceive it. Equability of diffusion, first deduced a priori and then corroborated by the inspection of phaenomena, is also a truth – I fully admit it. So far all is clear around me: –there are no clouds behind which the secret –the great secret of the gravitating modus operandi –can possibly lie hidden; –but this secret lies hereabouts, most assuredly; and were there but a cloud in view, I should be driven to suspicion of that cloud." And now, just as I say this, there actually comes a cloud into view. This cloud is the seeming impossibility of reconciling my truth, irradiation, with my truth, equability of diffusion. I say now: – "Behind this seeming impossibility is to be found what I desire." I do not say "real impossibility;" for invincible faith in my truths assures me that it is a mere difficulty after all –but I go on to say, with unflinching confidence, that, when this difficulty shall be solved, we shall find, wrapped up in the recess of solution, the key to the secret at which we aim. Moreover –I feel that we shall discover but one possible solution of the difficulty; this for the reason that, were there two, one would be supererogatory –would be fruitless –would be empty –would contain no key –since no duplicate key can be needed to any secret of Nature.

And now, let us see: –Our usual notions of irradiation –in fact our distinct notions of it – are caught merely from the process as we see it exemplified in Light. Here there is a Continuous outpouring of ray-streams, and with a force which we have at least no right to suppose varies at all. Now, in any such irradiation as this –continuous and of unvarying force –the regions nearer the centre must inevitably be always more crowded with the irradiated matter than the regions more remote. But I have assumed no such irradiation as this. I assumed no Continuous irradiation; and for the simple reason that such an assumption would have involved, first, the necessity of entertaining a conception which I have shown no man can entertain, and which (as I will more fully explain hereafter) all observation of the firmament refutes –the conception of the absolute infinity of the Universe of stars –and would have involved, secondly, the impossibility of understanding a reaction – that is, gravitation –as existing now –since, while an act is continued, no reaction, of course, can take place. My assumption, then, or rather my inevitable deduction from just premises –was that of a determinate irradiation –one finally discontinued.

¹ "Murders in the Rue Morgue."

Let me now describe the sole possible mode in which it is conceivable that matter could have been diffused through space, so as to fulfil the conditions at once of irradiation and of generally equable distribution.

For convenience of illustration, let us imagine, in the first place, a hollow sphere of glass, or of anything else, occupying the space throughout which the universal matter is to be thus equally diffused, by means of irradiation, from the absolute, irrelative, unconditional particle, placed in the centre of the sphere.

Now, a certain exertion of the diffusive power (presumed to be the Divine Volition) –in other words, a certain force –whose measure is the quantity of matter –that is to say, the number of atoms –emitted; emits, by irradiation, this certain number of atoms; forcing them in all directions outwardly from the centre –their proximity to each other diminishing as they proceed –until, finally, they are distributed, loosely, over the interior surface of the sphere.

When these atoms have attained this position, or while proceeding to attain it, a second and inferior exercise of the same force –or a second and inferior force of the same character –emits, in the same manner – that is to say, by irradiation as before –a second stratum of atoms which proceeds to deposit itself upon the first; the number of atoms, in this case as in the former, being of course the measure of the force which emitted them; in other words the force being precisely adapted to the purpose it effects –the force and the number of atoms sent out by the force, being directly proportional.

When this second stratum has reached its destined position –or while approaching it –a third still inferior exertion of the force, or a third inferior force of a similar character –the number of atoms emitted being in cases the measure of the force –proceeds to deposit a third stratum upon the second: –and so on, until these concentric strata, growing gradually less and less, come down at length to the central point; and the diffusive matter, simultaneously with the diffusive force, is exhausted.

We have now the sphere filled, through means of irradiation, with atoms equably diffused. The two necessary conditions –those of irradiation and of equable diffusion –are satisfied; and by the sole process in which the possibility of their simultaneous satisfaction is conceivable. For this reason, I confidently expect to find, lurking in the present condition of the atoms as distributed throughout the sphere, the secret of which I am in search –the all-important principle of the *modus operandi* of the Newtonian law. Let us examine, then, the actual condition of the atoms.

They lie in a series of concentric strata. They are equably diffused throughout the sphere. They have been irradiated into these states.

The atoms being equably distributed, the greater the superficial extent of any of these concentric strata, or spheres, the more atoms will lie upon it. In other words, the number of atoms lying upon the surface of any one of the concentric spheres, is directly proportional with the extent of that surface.

But, in any series of concentric spheres, the surfaces are directly proportional with the squares of the distances from the centre.²

Therefore the number of atoms in any stratum is directly proportional with the square of that stratum's distance from the centre.

But the number of atoms in any stratum is the measure of the force which emitted that stratum –that is to say, is directly proportional with the force.

Therefore the force which irradiated any stratum is directly proportional with the square of that stratum's distance from the centre: –or, generally, the force of the irradiation has been directly proportional with the squares of the distances.

Now, Reaction, as far as we know any thing of it, is Action conversed. The general principle of Gravity being, in the first place, understood as the reaction of an act –as the expression of a desire

² Succinctly –The surfaces of spheres are as the squares of their radii.

on the part of Matter, while existing in a state of diffusion, to return into the Unity whence it was diffused; and, in the second place, the mind being called upon to determine the character of the desire –the manner in which it would, naturally, be manifested; in other words, being called upon to conceive a probable law, or *modus operandi*, for the return; could not well help arriving at the conclusion that this law of return would be precisely the converse of the law of departure. That such would be the case, any one, at least, would be abundantly justified in taking for granted, until such time as some person should suggest something like a plausible reason why it should not be the case – until such a period as a law of return shall be imagined which the intellect can consider as preferable.

Matter, then, irradiated into space with a force varying as the squares of the distances, might, *a priori*, be supposed to return towards its centre of irradiation with a force varying inversely as the squares of the distances: and I have already shown³ that any principle which will explain why the atoms should tend, according to any law, to the general centre, must be admitted as satisfactorily explaining, at the same time, why, according to the same law, they should tend each to each. For, in fact, the tendency to the general centre is not to a centre as such, but because of its being a point in tending towards which each atom tends most directly to its real and essential centre, Unity –the absolute and final Union of all.

³ See previous paragraph, "I reply that they do; as will be distinctly..."

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