

## **Faith By Science**

### **The Dawn of a New Order of Things**

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" All for each and each for all."

[Page 3] A wave of unrest seems to be passing over the world. Uneasiness prevails on every side. We walk gingerly as though on the edge of a precipice. Discontent is spreading everywhere. The struggle between capital and labour threatens to reach unheard-of proportions ..... What is the meaning of the general restlessness ? What are its causes ? Is the world growing old and effete ? Is the human race worn out ? Is this generation incapable of the great achievements of the past ? Does its materialism clog its powers and prevent its progress ? Is the world going wrong for want of an ideal ? A people which does not believe in its lofty mission will never accomplish it. Science has made gigantic strides in our days; but have its discoveries added much to the sum of human happiness ? It has contributed to our material comfort in various ways, but it has not done much for the federation of the world. The great growth of luxury is not a good, but an evil, if it rob us of our belief in our great destiny and if it weaken our endeavour. If "the time is out of joint ", is it not possible that worship of wealth is responsible for it ? " He who makes haste to be rich shall not be innocent" Ours is emphatically the age in which men "make haste to be rich", without much regard to the means. Capital has profited unduly at the expense of labour; employers have attained to fortune too quickly for the welfare of the employed. Commerce has forsaken the path of safety to indulge in rash and reckless speculation. Businesses have been converted into companies more for the benefit of vendors and financial houses than for the public. Company promotion has been carried to reckless lengths, and schemes for getting rich rapidly — schemes of the South Sea bubble order — have multiplied in every part of the civilized world. The Nemesis has come in the shape of restlessness, discontent, paralysis of trade, strikes, disorganisation of finance, demoralisation of Bourses, and general insecurity.

Galignani's Messenger.

"The first seal is being broken in the book of Vibratory philosophy; the first stepping-stone is placed toward reaching the solution of that infinite problem, the origin of life."

— John Ernst Worrell Keely, 1890 [Page 4]

" The seals are opened, as it were, under the sign Leo — as believing that such an age is coming on in which prophecy may be fulfilled that the earth be filled with the knowledge of the Lord, which shall cover it with wisdom and understanding in the deep mysteries of God."

— Jane Lead, 1699.

" Evils bear in themselves the causes of their own extirpation. Providence is bringing the old order of things to a close in order to provide place for something better and higher".

—Julian Hawthorne.

Professor Rowland, in his paper on the "Spectra of Metals", which he read at Leeds, says that the object of his research is "primarily to find out what sort of things molecules are, and in what way they vibrate". The primary object of Mr. Keely's researches has been to find out all that he could about the laws that control vibrations, and on this line of research he made his discoveries, as to "what sort of things molecules and atoms are, and in what way they vibrate". One of the editors of the *Times*, in London, in January, 1891, wrote out this question for Keely to answer: — "What impulse led you primarily into the research of acoustic physics ? " Keely replied, "An impulse associated sympathetically with my mental organism from birth, seemingly, as I was acutely sensible of it in my childhood. Before I had reached my tenth year, researching in the realm of acoustic physics had a perfect fascination for me; my whole organism seemed attuned as if it were a harp of a thousand strings, set for the reception of all the conditions associated with sound force, as a controlling medium, positive and negative; and with an intensity of enjoyment, not to be described. From that time to the present, I have been absorbed in this research, and it has opened up to me the laws that govern the higher workings of nature's sympathetic, hidden forces; leading me gradually on to the solution of the problem relating to the conditions that exist between the celestial and terrestrial out-reaches, viz., polar negative attraction". Another question asked by the same editor (in January, 1891): — " What is the main difficulty to be overcome before completing the system for commercial benefit ? " Answer: — "The principal difficulty rests in equating the thirds of the thirds of the transmitters (*i.e.*, the gold, silver, and platina sections of which the transmitting wires are composed) to free them of molecular differentiation. The full control of this force can never be accomplished, until pure molecular equation is established as between the nodal interferences (that result in their manufacture) and the chord mass of their sectional parts. When this has been done, the chasm between the alternation of the polar forces, which now exists, preventing the inducing of polar and depolar conditions, will be bridged over and commercial benefits at once established as the result. The devices for inducing these conditions, primarily, are perfect : but the pure, connective link on transmission [Page 5] has to bequeathed, before continued mechanical rotation and reversion can be attained".

As has already been said, Keely's researches have all been on the line of vibrations; and it was while pursuing them that he "stumbled over", to use his own words, the inter-atomic sub-division of the molecule, which released the Geni that for years thereafter was his master. Keely's attention not having been turned to molecules and atoms, he was not able, in the earliest years of his discovery (of the existence of a " force of nature more powerful and more general even than electricity") to form any

opinion as to the origin of the force. He was as one who, in the thick darkness of an underground labyrinth, found himself face to face with a giant, whose form even he could not see, to lay hold of in a death grapple; but when a germ of the knowledge that he needed fell on his mind, he was quick to seize it, and the acorn grew into an oak. Here again, to use his own words: — "I was as a boulder resting on the summit of a mountain, until an introductory impulse was given to start it on its course; then, rushing onwards and carrying all before it, its concussion, when the goal is reached, will produce the crash that will awaken a sleeping world".

Priestley proclaimed it as his belief that all discoveries are made by chance; but "Providence sends chance", and the man of genius is he who is able to improve all opportunities and mould them to his own ends. In a discovery, says Edison, there must be an element of the accidental, and an important one too: discovery is an inspiration, while an invention is purely deductive. The story of the apple dropping from the tree, and Newton starting with a species of "Eureka", he rejects absolutely. Maintaining that an abstract idea or a natural law may, in one sense, be invented, he gives it as his opinion that Newton did not discover the theory of gravitation, but invented it; and that he might have been at work on the problem for years, inventing theory after theory, to which he found it impossible to fit his facts. That Keely claims to have discovered an unknown source of energy has not seemed to disturb the equilibriums of some of the men of science who have witnessed the demonstrations of the force, as much as that he should have invented theories in regard to the operation of the laws that control it. For a man who had lived more than half-a-century without troubling himself as to the existence of molecules and atoms to suddenly awaken to the knowledge of their existence, and to invent theories as to "what sort of things they are and how they vibrate", was sufficient proof, in their eyes, that he invented his discovery; but men who are, in thought, reaching out into unknown realms, are the very men who are most likely to lay hold of a discovery; — as did Bell, who, speculating upon the nature of sound, filed an invention for his telephone before he discovered that articulate speech could be conveyed along a wire. It was in the same way that [Page 6] Keely, speculating upon the nature of vibration, was led into the field of invention; and while experimenting with one of his inventions, he suddenly stepped into that great unknown territory which lies beyond the horizon of ordinary matter. It took him nearly a score of years to find out where he was. Years of experiment followed before he was able to summon the Geni at will; for when his lever first registered a pressure of 2000 lbs., while subjecting water to the action of multiplied vibrations, he had no idea how to proceed, as far as the number of vibrations was concerned, to repeat the operation. Commencing at a certain point, he increased the vibrations day by day; until, six years later, he was able to affect the dissociation at will. But at that time Mr. Keely had too much mechanical work to do to give any of his time to theorizing. He was in the clutches of a speculating Keely Motor Company, whose cry was, "Give us an engine!" and day and night this toiler fought his way in the underground labyrinth, thinking only of a commercial engine. It was not until Macvicar's "Sketch of a Philosophy" fell into Mr. Keely's hands that he realized he had imprisoned the ether. This was in 1884, and four years later, in 1888, Prof. Hertz of Bonn announced that we were using the ether, without knowing it, in all electro-magnetic engines. By this time, Keely's researches, in vibratory physics, had led him well on his way in the construction of hypotheses as to "what sort of things molecules are, and in what way they vibrate". An hypothesis treats a supposed thing as an existing thing, for the purpose of proving, by experimental demonstration, whether the supposition is correct or not. At a critical juncture, Mrs. J. F. Hughes (a grand-niece of Charles Darwin), hearing of Keely's researches, became interested in his work; and her book on "*The Evolution of Tones and Colour*" was sent to Mr. Keely. An expression used by Mrs. Hughes in that work brought a suggestion to Mr. Keely. The veil of darkness was rent asunder which had enveloped him in what he called, "Egyptian blackness", and from that time he worked no longer in the dark.

Pythagoras taught that the same law which underlies harmonies underlies the motion of the heavenly bodies, or, as Mrs. Hughes has expressed it, "The law which develops and controls harmony develops and controls the universe". Mr. Keely, nothing daunted by the vast extent, the stupendous "outreach" of the domain, the boundary line of which he had thus crossed, concentrated all his energies upon "the situation"; thinking, thereafter, not alone of the interests of commerce as before, but of the developing of a system, which he could give to science in the same hour that he should hand over, to those whose thoughts were only on financial gain, the inventions which our age is demanding, in the interests of humanity, with the stern voice of the master necessity; a voice which never fails to make itself heard in "the voice of the people". Experiment after experiment justified [Page 7] his hypotheses and converted them into theories. To keep pace with the wants of humanity, invention must now walk side by side with philosophy. It took half a century for the "Principia" of Newton to tread down the contempt and opposition that its publication met with; and now progressive knowledge is overshadowing Newton's vast attainments. Faraday, after discovering electro-magnetic conditions, as related to latent or hidden energy, did not pursue his researches far enough to establish a theory as to the mode of transference of magnetic force, though, in some of his speculations on the line of force, he hit upon truths now advanced in Keely's theories. The physicists of Faraday's time could not reach up to him. They complained of his "obscurity of language", of his "want of mathematical precision", of his "entertaining notions regarding matter and force altogether distinct from the views generally held by men of science". It is not then to be wondered at that modern physicists took up lines of research more in accordance with their own views. The experiences of one age are repeated in another age; and the same charges that were brought against Faraday are now brought against Keely, with shameful attempts to prove him to be "a fraud"; a man "living upon the credulity of his victims"; "a modern Cagliostro"; "an artful pretender". The question is often asked, "Is he not an ignorant man?" Yes, so ignorant, that he knows how ignorant he is; so ignorant, that he asserts, with Anaxagoras, that intelligent will is the disposer and cause of everything; and not satisfied with asserting this great truth, he has devoted the remnant of his days to finding out and demonstrating how this cause operates throughout nature. But ignorant as Keely has always confessed himself to be, he knows more of the mysterious laws of nature which hold the planets in their courses and exert their dynamic effect upon the tides, more of the "shock effect" which, brought to bear upon molecules, causes their disruption and supplies the fine fluid thus liberated, which extends the "shock effect", as Frederick Major has conjectured, to the atoms that compose them. Ignorant as Keely is, he knows that "out of the strife of tremendous forces, which is ever going on in nature, is born a creation of law and harmony"; that from atomic recesses to the farthest depth there is naught but "toil co-operant to an end", that "all these atoms march in time, and that it is no blind cause which originates and maintains all". Admitting his ignorance, Keely claims with Dr. Watson that "the many who are compelled to walk should not scoff at those who try to fly". All who agree in believing that "the advance of the modern school of natural philosophy affords no justification for the intolerant and exclusive position taken by certain physicists", will be ready to examine Keely's theories, in the light of his demonstrations, even although they have been stigmatised as fallacies. Science owes large obligations to many fallacious theories.

Canon Moseley has said that the perfecting of the theory of epicycles [Page 8] is due to the astrologers of the middle ages; and that but for them the system of Copernicus would have remained a bare speculation, as did that of Pythagoras for more than two thousand years. In the same way that astrology nurtured astronomy, chemistry was cradled by alchemy.

Keely welcomes criticism of his theories, and is able to answer all who come to him, with criticisms, in a proper spirit; but to quote one of his own expressions, "as far as a physical truth is concerned I never throw up the sponge for any one". Of Professor Crookes, Keely wrote quite recently: "Your friend is

wrong in saying that I dabble in chemical heresies. There must be some misunderstanding on his part, for I have never asserted that nitrogen is a necessary constituent of water. I only said that, after a thousand experiments had been conducted, there was a residual deposit, in one of my tubes, of a resinous substance, that showed nitrogenous elements, which I could not account for. I consider Professor Crookes one of the greatest of discoverers, and, when he understands my system, he will be one of the first to endorse it".

A philosophical journalist says of the force discovered by Keely, that "it is harder to believe in than either steam or electricity, because it has no visible manifestation in nature. It does not rise in white clouds from every boiling kettle or flash with vivid light in every thunderstorm. It does not show itself in the fall of every loosened body to the earth, like gravitation, nor can it be discovered, like oxygen, by chemical investigation. If it exists at all, it is in a form entirely passive, giving no hint of its presence until it is brought out by the patient investigator, as the sculptor's chisel brings out the beautiful statue from the shapeless mass of marble.

"Working thus entirely in the dark, with an intangible, imponderable, invisible something whose nature and attributes are all unknown, and whose characteristics differ essentially from those of any other known force, what wonder if the inventor's progress is slow and his disappointments many? Mr. Keely may be deceived or he may have discovered an actual force which he is unable to harness; but the fact that he is very slow in perfecting whatever discovery he may have made is no proof that he has not made a very great one.

"Far be it from us to say in this age of scientific marvels, that any proposition whatever is impossible of accomplishment; but while we wait for Mr. Keely to make his alleged discovery public before we become enthusiastic over it, we would not set it down as a fraud and the reputed discovery as a humbug. It is the nature of inventors to be enthusiastic, and to think that they are on the eve of success when, in fact, a great deal remains to be done.

"Especially is this the case in the development of "a hitherto unknown force. James Watt had a comparatively straight road to travel from his mother's tea-kettle to his first steam-engine, but it took him many [Page 9] years to traverse it. More than a lifetime elapsed after Franklin drew electricity from a cloud before Morse sent it over a telegraph wire, and Morse himself worked for years to make it available for business purposes, while men are still constantly finding new adaptations of the mysterious force of which that was the first practical application".

But, as Frederick Major has said, "Science at present is too full of its own erroneous theories to accept or even notice theories outside of science, until practically proved, and, probably, not even then, unless they can foist them upon the public as partially their own". These words are not applicable to all men of science. There are some, among those most eminent, who, in the spirit of true science, are quite prepared for other roads to knowledge than those of our three hundred years old induction school. The late Professor W. K. Clifford, F.R.S., was one of those men who, in their earnest desire for "truth at any cost", was ready to advance in every direction open to him. No "fear of a false step" held him back. He did not belong to the category of philosophical sceptics whom Dr. Stoney has so well classified as damping all advance, unless it can be carried on, from the beginning, under such conditions of perfection as are impossible in the early stages of every discovery and of almost every inquiry. Professor Stoney

has well described Keely's method of work in these remarks: "In the scientific method of investigating the validity of our beliefs, we take our existing beliefs as our starting point, or a careful selection of those which are fitted to enable us to advance. After the legitimate consequences of these have been worked out, the inquirer finds himself in a better position to return and test the validity of the bases on which he proceeded. After these revisions, and such corrections as he finds possible, he makes a step of a like kind farther forward: after which another revision and another advance. Thus real progress is accomplished. Probabilities acquire strength and accumulate; and in the end a state of mind is attained replete with knowledge of the realities within and around us. The sea of knowledge on which man makes his brief voyage is for the most part unfathomable. He cannot hope, except near shore, to measure the *whole* depth, and thus attain philosophical certainty. But the scientific student may diligently use such a sounding line as he possesses — that of probability — and with it explore wide expanses under which there are no rocks or shoals within the utmost depth that he can plumb, and over which he may securely sail. Compare this with the situation of the philosophical sceptic, groping among rocks along the shore, and not venturing beyond the shallow margin which he can probe with his little pole".

Professor Clifford struck out boldly in this unfathomable ocean of knowledge, when he admitted the infinite divisibility of the atom, which is one of the bases of Keely's theories. And how exquisitely did his penetrating vision pierce the mists of materialism, when he wrote: "Every time [Page 10] that analysis strips from nature the gilding that we prized, she is forging thereout a new picture more glorious than before, to be suddenly revealed by the advent of a new sense whereby we see it — a new creation, at sight of which the sons of God shall have cause to shout for joy. What now shall I say of this new-grown perception of Law, which finds the infinite in a speck of dust, and the act of eternity in every second of time ? Shall I say that it kills our sense of the beautiful, and takes all the romance out of nature ? And, moreover, that it is nothing more than a combining and reorganising of our old experiences; that it never can give us anything really new; that we must progress in the same monotonous way for ever. But wait a moment. What if this combining and organising is to become first habitual, then organic and unconscious, so that the sense of law becomes a direct perception ? Shall we not then be really seeing something new ? Shall there not be a new revelation of a great and more perfect cosmos, a universe fresh-born, a new heaven and a new earth ? *Mors janua vitae*, by death to this world we enter upon a new life in the next.

"Doubtless there shall by-and-by be laws as far transcending those we now know as they do the simplest observation. The new incarnation may need a second passion; but, evermore, beyond it is the Easter glory".

In these words there is the true ring of divinely inspired prophecy to those who know of the pure philosophy which Keely's system unfolds; teaching the "wondrous ways of Him who is perfect in knowledge". Professor Clifford was one of those whom Ernest Renan has 'classified as "scouts in the great army, who divine beforehand that which becomes ere long patent to all. In their rapid and venturesome advance they catch sight before the others of the smiling plains and lofty peaks". The student of nature has been compared to a hound, wildly running after, and here and there chancing on game, "universal exploration, a beating up of the game on all sides, that and that only is the sole possible method". And this is the spirit of those who pursue their researches in a scientific frame of mind: while those who enter the field in a skeptical mood, are indisposed to step out of the beaten track where they feel sure of their footing.

They have no ambitions to meet the fate of the trilobites in Professor Clifford's amusing apologue. "Once

upon a time — much longer than six thousand years ago — the Trilobites were the only people that had eyes; and they were only just beginning to have them. Some of the Trilobites, even, had as yet no signs of coming sight, so that the utmost they could know was that they were living in darkness, and that perhaps there was such a thing as light. But at last one of them got so far advanced that when he happened to come to the top of the water in the daytime he saw the sun. So he went down and told the others that in general the world was light, [Page 11] but there was one great light which caused it all. Then they killed him for disturbing the commonwealth; but they considered it impious to doubt that in general the world was light, and that there was one great light which caused it all. And they had great disputes about the manner in which they had come to know this. Afterwards another of them got so far advanced that when he happened to come to the top of the water, in the night-time, he saw the stars. So he went down and told the others that in general the world was dark, but that, nevertheless, there was a great number of little lights in it. Then they killed him for maintaining false doctrines: but from that time there was a division amongst them, and all the Trilobites were split in two parties, some maintaining one thing and some the other, until such time as so many of them had learned to see that there could be no doubt about the matter that both of the savant Trilobites were right".

Bacon has compared the mind of man to a prisoner in a cave with his back to the light, who sees only shadows of the events passing outside.

Dr. Stoney, in his paper on "Natural Science and Ontology", frames a working hypothesis, which leads up to Keely's theory that "the laws of the universe are the laws of thought". "This is a very different thing", says Dr. Stoney, "from saying that they are the laws of human thought. The laws of human thought bear to them the same small proportion which the laws of the action of the wheels of a watch upon one another bear to the entire science of dynamics. . . . Natural science is thus, as it were, the study of an ever-changing shadow cast in a special and very indirect way by the mighty march of actual events".

"The history of philosophy", writes Ernest Renan, "should be the history of the thoughts of mankind. Hence we must look upon philology, or the study of ancient literatures, as a *science* having a distinct object, viz., the knowledge of the human intellect".

The philologist and the chemist, because of the results of the researches of the one, and of the nature of the researches of the other, are the students who are best able to comprehend the discoveries of Keely. "It is the characteristic and the pride of modern science to attain its most lofty results only through the most scrupulous methods of experiment, and to arrive at the knowledge of the highest laws of nature, its hands resting on its apparatus. If the highest truths can, as it were, emanate from the alembic and the crucible, why should they not equally be the result of the study of the remains of the past, covered with the dust of ages? Shall the philologist who toils on words and syllables be less honoured than the student of chemistry labouring in his laboratory? It is impossible to guess beforehand what may result from philological researches, any more than one can know, in digging a mine, the wealth it may contain. We may be on our way to the discovery of a new world. Science always presents [Page 12] itself to man as an unknown country. The most important discoveries have been brought about in a roundabout way. Very few problems have been deliberately grappled with at the outset, 'taken at the core'. There is nothing more difficult to foretell than the importance with which posterity will invest this or that order of facts; the researches that will be abandoned, the researches that will be continued. In looking for one thing one may stumble upon another; in the pursuit of a mere vision, one may hit upon a magnificent reality.

When a result has been attained, it is difficult to realise the trouble its attainment has cost. — Ernest Renan in "The Future of Science".

Of this nature have been the researches of the present distinguished Professor of Chemistry in the Royal Institution, leading him into a discovery, the great importance of which the future alone can unfold.

Professor Dewar's brilliant success in producing liquid oxygen will be remembered by all who had the privilege of witnessing it last year, on the occasion of the celebration of Faraday's Centenary. Its production is attended with the greatest difficulties; so great that Professor Dewar even felt doubts as to his being successful in his attempt at that time, which made his complete success all the more gratifying to him. When produced, it is difficult to hold and difficult to manipulate; but nothing daunted by these difficulties, Professor Dewar continued his researches, subjecting it to tests which no mind less penetrating than his own would ever have thought of, with the result that, most unexpectedly to himself, he has "hit upon a magnificent reality". The ordeal to which, with consummate skill, he subjected this unstable fluid, disclosed its marvellous affinity for the magnet; and iron is now no longer able to claim the distinction which it has hitherto enjoyed, of monopolizing the affections of the magnet. Sir Robert Ball, L.L.D., F.R.S., in commenting upon this important and most interesting addition to our knowledge of the properties of oxygen, says: — "Seeing that water, which is so largely composed of oxygen, is not attracted by a magnet, it might certainly have seemed unlikely that a liquid which was nothing but pure oxygen should be affected to any noteworthy degree. I suspect, however, that Professor Dewar must have had some sagacious reason for anticipating that the magnet would treat liquid oxygen with much more attention than it bestowed on water. At all events, whether he expected it or not, the result as described was of the most extraordinary character. The liquid oxygen was vehemently attracted by the great magnet; it seems to have leaped from the vessel, to have clung round the poles, and continued to adhere to them until it had all evaporated and resumed the form of gas. The appreciation of this discovery will be shared not alone by chemists, but by all who are interested in the great truths of nature".

When Mr. Keely hit upon his discovery of an unknown force, he had [Page 13] not the faintest conception of the infinite extent, nor of the nature, of the territory he had invaded. Step by step he had been led on through years of patient and persistent research, yet even now feeling that he has but lifted one corner of the veil of the goddess of nature, and that a lifetime is too short to do more than this. The physicists whom Keely, in the earlier years of his discovery, invited to confer with him as to the origin of the force which was generated by the disintegration of water, preferred rather to pronounce him an impostor, after witnessing his demonstrations, than to admit that such a result should have escaped the penetration of their all-powerful methods. "It indicates", says Dr. Watson, "a mistaken apprehension of the basis of our own so highly valued system of enquiry, that we should arrogate to it absolute exclusiveness, and deride, as though they were searchers after proved impossibilities, all those who choose to make the trial whether truth may be sought by any method besides our own".

History repeats itself, but on new planes. It is not those who are mighty in their own eyes whom Providence chooses as instruments to reveal new truths to the world when the needs of humanity require "a new order of things". The evolution of the human race is slow but sure. If in one century some backward steps are taken, in the next with giant strides all is regained that seemed to have been lost. Each age answers the need of its own time. "The condition of mankind, during the last quarter of the fifteenth century, bore some curious analogies to its state at present", writes Julian Hawthorne, under the heading, "The New Columbus". "A certain stage or epoch of human life seemed to have run its course



and come to a stop. *The impulses which had started it were exhausted.* Once more it seems, we have reached the limits of a dispensation, and are halted by a blank wall. There is no visible way over it, nor around it. We cannot stand still; still less can we turn back. What is to happen? What happens when an irresistible force encounters an impenetrable barrier? That was the question asked in Columbus' day; and he found an answer to it. Are we to expect the appearance of a new Columbus to answer it again? What Columbus can help us out of our dangers now? The time has come when the spirit of Columbus shall avouch itself, vindicating the patient purpose of Him who brings the flower from the seed. Great discoveries come when they are needed; never too early nor too late. When nothing else will serve the turn, then, and not till then, the rock opens and the spring gushes forth. Who that has considered the philosophy of the infinitely great and of the infinitely minute can doubt the inexhaustibleness of nature? And what is nature but the characteristic echo of the spirit of man? A prophet has arisen, during these latter days, in Philadelphia, who is commonly regarded as a charlatan; but men cognizant of the latest advances of science, admit themselves unable to explain upon any known principles the effects he produces". [Page 14]

"What we are to expect is an awakening of the soul; the rediscovery and rehabilitation of the genuine and indestructible religious instinct. Such a religious revival will be something very different from what we have known under that name. It will be a spontaneous and joyful realization by the soul of its vital relations with its Creator. Nature will be recognised as a language whereby God converses with man. The interpretation of this language, based as it is upon an eternal and living symbolism, containing infinite depths beyond depths of meaning, will be a sufficient study and employment for mankind for ever. Science will become, in truth, the handmaid of religion, in that it will be devoted to reporting the physical analogies of spiritual truths, and following them out in their subtler details. Hitherto the progress of science has been slow, and subject to constant error and revision. But as soon as physical research begins to go hand-in-hand with moral or psychical, it will advance with a rapidity hitherto unimagined, each assisting and classifying the other.

"The attitude of men towards one another will undergo a corresponding change. It is already become evident that selfishness is a colossal failure. . . . Recent social theorists propose a universal co-operation, to save the waste of personal competition. But competition is a wholesome and vital law; it is only the direction of it that requires alteration. When the cessation of working for one's livelihood takes place, human energy and love of production will not cease with it, but will persist and must find their channels. But competition to outdo each in the service of all is free from collisions, and its range is limitless. Not to support life, but to make life more lovely, will be the effort; and not to make it more lovely for one's self alone but for one's neighbour. Nor is this all.

"The love of the neighbour will be a true act of divine worship, since it will then be acknowledged that mankind, though multiplied to human sense, is in essence one; and that in this universal one, which can have no self-consciousness, God is incarnate.

"The divine humanity is the only real and possible object of mortal adoration, and no genuine sentiment of human brotherhood is conceivable apart from its recognition. But, with it, the stature of our common manhood will grow toward the celestial. Obviously, with thoughts and pursuits of this caliber to engage our attention, we shall be very far from regretting those which harass and enslave us today. Leaving out

of account the extension of psychical faculties, which will enable the antipodes to commune together at will, and even give us the means of communicating with the inhabitants of other planets, and which will so simplify and deepen language that audible speech, other than the musical sounds indicative of emotion, will be regarded as a comic and clumsy archaism, — apart from all this, the fathomless riches of wisdom to be gathered from the commonest [Page 13] daily objects and outwardly most trivial occurrences, will put an end to all craving for merely physical change of place and excitement. Gradually the human race will become stationary, each family occupying its own place, and living in patriarchal simplicity, though endowed with power and wisdom that we should now consider god-like ..... We have only attempted to indicate what regions await the genius of the new Columbus; nor does the conjecture seem too bold that perhaps they are not so distant from us in time as they appear to be in quality".

If we turn, from this seemingly Utopian forecast, to the matter-of-fact utterances of Ernest Renan, we will find that he anticipates nothing less as the destiny of humanity, than the perfecting of it as a unity. Asserting that the nineteenth century is preparing the way for the enfranchisement of the mind, he proceeds logically to show how this evolution is to be brought about, strong in his faith that Providence will not fail in its design to secure the ultimate happiness of the human race. To quote, at length, from Renan: — "It is the law of science, as of every human undertaking, to draw its plans on a large scale and with a great deal that is superfluous around them. Mankind finally assimilates only a small number of the elements of its food. But the portions that have been eliminated played their part in the act of nutrition. So the countless generations that have appeared and disappeared like a dream, have served to build the great Babel of humanity which uprises toward the sky, each layer of which means a people. In God's vast bosom all that lived, will live again, and then it will be true to the very letter that not a glass of water, not a word that has furthered the divine work of progress will be lost. That is the law of humanity; an enormous and lavish expenditure of the individual; for God only sets himself the large, general plan; and each created being finds subsequently in himself the instincts which make his lot as mild as possible. All help on, accelerate the day when the knowledge of the world shall equal the world, when the subject and the object having become identified, God will be complete. Philosophy up till now has scarcely been anything but fancy, *a priori*, and science has only been an insignificant display of learning. As for us, we have shifted the field of the science of man. We want to know what his life is, and life means both the body and the soul; not placed facing one another like clocks that tick in time, not soldered together like two different metals, but united into one two-fronted phenomenon which cannot be divided, without destroying it. It is time to proclaim the fact that one sole Cause has wrought everything in the domain of intellect, operating according to identical laws, but among different surroundings.

"The lofty serenity of science becomes possible only when it handles its imperturbable instrument with the inflexibility of the geometrician, without anger and without pity. True science, the complete and felt science will [Page 16] be for the future, if civilization is not once again arrested in its march by blind superstition and the invasion of barbarism, in one form or another. But it is contended that the inferiority of philosophy of science consists in its being accessible to the small minority. This is, on the contrary, its chief title to glory, showing us that we should labour to hasten the advent of the blessed day in which all men will have their place in the sunshine of intelligence and will live in the true light of the children of God. It is the property of hope to hope against hope, and there is nothing which the past does not justify us in hoping from the future of humanity. Perfect happiness, as I understand it, is that all men should be perfect. I cannot understand how the opulent man can fully enjoy his happiness while he is obliged to veil his face in presence of the misery of a portion of his fellow-creatures. There can only be perfect happiness when all are equal, *but there will only be equality when all are perfect*. Thus we see that it is not a question of being happy; it is a question of being perfect; a question of true religion; the only thing

which is serious and sacred. Inequality is legitimate whenever inequality is necessary for the good of humanity. Rights create themselves like other things. The French Revolution is not legitimate because it has taken place, but it took place because it was legitimate; the freeing of the negroes was neither achieved nor deserved by the negroes, but by the progress in civilization of their masters. Right is the progress of humanity; there is no right in opposition to this progress, and, *vice versa*, progress legitimizes everything. Never, since the origin of things, has human intelligence set itself so terrible a problem as the one which now menaces our age. Upon the one hand, it is necessary to preserve the conquests already secured for civilization; while upon the other, all must have their share in the blessings of this civilization. It took centuries to conceive the possibility of a society without slavery. The traveler who looks only at the horizon of the plain risks not seeing the precipice or the quagmire at his feet. In the same way, humanity when looking only to the distant object is tempted to make a jump for it, without regard to the intermediate objects against which it may not improbably dash itself to pieces. Socialism is, therefore, right to the extent of discerning the problem, but solves it badly; or rather socialism is not yet possible of solution. Reforms never triumph directly; they triumph by compelling their adversaries to partially adopt them in order to overcome them. It might be said of reforms as of the crusades: "Not one succeeded: all succeeded". As one sees the tide bringing the ever collapsing waves upon the shore, the feeling aroused is one of powerlessness. The wave arrived so proudly, and yet it is dashed to pieces against the sand, and it expires in a feeble career against the shore which it seemed about to devour. But, upon reflection, one finds that this process is not as idle as it seems; for each wave, as it dies away, has its effect; and all the waves [Page 17] combined make the rising tide against which heaven and hell would be powerless. Humanity, when it is fatigued, is willing to pause; but to pause is not to rest. The calm is but an armistice and a breathing space. It is impossible for society to find calm in a state when it is suffering from an open wound such as that of today. The age is oppressed by this inevitable and seemingly insoluble problem. We barricade ourselves in one party, in order not to see the reasons of the other side. The conservatives are wrong, for the state of things which they uphold, and which they do right to uphold, is intolerable. The revolutionists are wrong; for it is absurd to destroy when you have nothing to put in place of what you destroy. At these epochs, doubt and indecision are the truth; the man who is not in doubt is either a simpleton or a charlatan. Revolutions must be made for well-ascertained principles, and not for tendencies which have not yet been formulated in a practical manner. They are the upheavals of the everlasting Enceladus turning over when Etna weighs too heavily upon him. It is horrible that one man should be sacrificed to the enjoyment of another. If it were merely a question of self-indulgence, it would be better that all should have Spartan fare than that some should have luxuries and others go hungry; but as long as material ease is to a certain extent the indispensable condition of intellectual perfection, the sacrifice is not effected for the enjoyment of another individual of the luxuries of life, but it is made upon behalf of society as a whole. A society is entitled to what is necessary for its existence, however great may be the apparent injustice resulting for the individual. It is the idea of the ancient sacrifice — the man for the nation. If the object of life were but self-indulgence, it would not be unreasonable that each one should claim his share, and from this point of view any enjoyment which one might procure at the expense of others would be in reality an injustice and a robbery: but the object of life, the aim of society, should be the greatest possible perfecting of all. The State is neither an institution of police, as Smith would have it, nor a charity bureau and a hospital as the Socialists would have it. It is a machine for making progress. In the state of things which I should like to see, manual labour would be the recreation of mental labour. The immense majority of humanity is still at school: to let them out too soon would be to encourage them in idleness. Necessity, says Herder, is the weight of the clock which causes all the wheels to turn. Without the idea of progress, all the ideas of humanity are incomprehensible. We must keep our machines in order, if we would bring down paradise upon earth; and paradise will be here below when all have their share in light, perfection, beauty, and therefore in happiness.

"It matters little whether the law grants or refuses liberty to new ideas, for they make their way all the same; they come into existence without the law, and they are all the better for this than if they had grown in full [Page 18] legality. When a river which has overflowed its banks pours onward, you may erect dykes to arrest its progress, but the flood continues to rise; you may work with eager energy and employ skilful labourers to make good all the fissures, but the flood will continue to rise until the torrent has surmounted the obstacle, or until, by making a circuit of the dyke, it comes back by some other way to inundate the land which you have attempted to protect from it".

These are the advanced views of Ernest Renan, who still sees nothing before us but a fresh cataclysm, a general upheaval and chaos, terrible disturbances when human intelligence will be checkmated, thrown off the rails, so to speak, by events as yet unparalleled. We have not yet suffered sufficiently, he says, to see the kingdom of heaven. When a few millions of men have died of hunger, when thousands have devoured one another, when the brains of the others, carried off their balance by these darksome scenes, have plunged into extravagances of one kind and another, then life will begin anew. Suffering has been for man the mistress and the revealer of great things. Order is an end, not a beginning; but out of respect for the rights of bears and lions are we to open the bars of a menagerie? Are these beasts to be let loose upon men? No, for humanity and civilisation must be saved at any cost. But these problems, which make up the capital question of the nineteenth century, are, in a speculative sense, insoluble; they will be solved by brute force, says Renan. "The crowd behind is ever pressing forward; those in the foremost ranks are toppled over into the yawning gulf, and when their bodies have filled up the abyss, the last comers pass over on the level".

But let us suppose that what pseudo-science has wrested from us, true science is ready to restore; ready to offer all that Renan himself tells us is necessary to open the way for the elevation of the people, by giving all men a share in the delights of education; thus widening the basis of the brotherhood of humanity, and making room for all at the banqueting-table of knowledge, enabling men to be "*perfect in their measure*", for "absolute equality is as impossible in humanity as it would be in the animal reign. Each part is perfect in the hierarchy of the parts when it is all that it can be, and does well all that it ought to do".

Let us suppose that true science offers confirmation of all that our holy men have taught of the attributes of the Creator of all things, reiterating the promise of a time when this knowledge shall be spread over the face of the whole earth and made known to all men. Let us imagine that, in addition to the opening of these floodgates of knowledge, the time is drawing near when machinery, unknown now, will be employed to help the workman in his task, and abridge his hours of labour, leaving leisure for the cultivation of his mind. Aristotle has told us what would be the result, "if every instrument could work of its own accord, if the spindles worked of themselves [Page 19] if the bow played the violin without being held, the contractors could do without workmen and the masters without slaves". Man would so master nature that material requirements would no longer be the supreme motive, and human activity would be directed towards the things of the mind. In such a state of existence men of intelligence would "conquer the infinite". — Schlegel.

We are living in a period of wondrous revelations of the power of God and the crowning discovery of this epoch promises the fulfilment of Scripture prophecy in a dispensation of harmony and peace, that will restore to mankind that measure of faith in God and immortality, which can alone give strength "to endure the evil days without feeling the weight of them" that lie between the present time and the realisation of

our hopes for the perfection of humanity. With the knowledge that lies in this new revelation of the power of the All-Mighty, no hopes seem chimerical or Utopian. We shall all be as gods, when the fulness of the love of God and the power of God is made known to, and understood by all men. Tossing as we are in a seething whirlpool of scepticism, threatened as are the nations with dangers on all sides, if we were bereft of our God as the leading lights of science would have us believe, there would be no hope for humanity. But though the anchor of ancient faiths has been swept away by materialism, the sheet-anchor of faith by science has been let down from heaven, as it were, in our hour of peril, for the saving of the peoples: teaching as often before that the world lies in the bosom of God, like a child in its mother's arms, who with watchful solicitude ministers to its wants as they arise.

Religion, as revealed to us by our Holy Master, Jesus Christ, is to know and to love the truth of things. When this religion is understood and practised, then, and not before, will the earth be full of the knowledge that it is God who is, and that all the rest only appears to be. If anarchy and disorder would but wait for this time to arrive, no devastating cataclysms, no destroying whirlwinds, will come as forerunners to prepare the way, as in the past, for progress. The light now dawning will usher in "the new order of things", and we may expect that an era of material prosperity will soon set in, such as the world has never dreamed of; arresting the outbreak of barbarism which seems near at hand. There are some who contend that this revelation of an unknown force will, in the hands of anarchists, put back the progress of civilisation and enlightenment for centuries; there are others who proclaim that it will take the bread from the mouths of the hungry and swell the sums amassed by capitalists. But history shows that discovery heralds progress, and walks with it hand in hand. With the costless and unlimited power which will be made available, in every direction where power is required, all works of improvement will be carried out on a far grander scale than has ever been anticipated. The great polar stream, with its exhaustless supply of energy, places at our disposal a force [Page 20] as harmless as the current that draws its keeper to the magnet. We have but to "hook our machinery on to the machinery of nature", and we have a safe and harmless propelling and controlling force, the conditions of which when once set up remain forever, perpetual molecular action the result. Another step made toward the conquering of the material world which must precede the advent of the reign of the spirit.

Schlegel foresaw that the only hope for a brotherhood of humanity lay in the thorough religious regeneration of the State and of science, and that through these combined powers the underlying purpose of Eternal Mind is to be made known, covering the earth with the knowledge of God as the waters cover the beds of the seas, obtaining a complete triumph for Christianity.

It would fill with despair the hearts of those who are working to bring about this end (so slow, so retrograde at times, does the evolution seem to be) did they not know that they have an Invincible Power working with them.

History has again repeated itself, and truth has once more had its birth in a stable. A star has arisen in the West which heralds to all races what the Star of Bethlehem heralded in Judea, *viz.*, the coming of the time when the earth shall be filled with the knowledge of the Lord. There are both Magi and shepherds now, as of old, who have watched for the rising of this star, and who were the first to behold the gold and crimson light of the approaching dawn, in which the faith that modern science crucified and laid away in its sepulchre, will have its resurrection and dwell on earth for evermore, the tabernacle of God with men.

## THE DAWN

I believe the dawn is fast approaching when all scepticism will be wiped from the face of the earth and true science will become the religion of mankind. — JOHN ERNST WORRELL KEELY.

Dante called his lifetime, "the time of my debt".

Have I not paid my debt, O God,  
What have I left to give ?  
Blest is my life in rendering all  
To help the nations live  
In harmony, in peace, in love,  
As nations all will be,  
When knowledge true shall cover earth  
As waters cover sea.

Nailed to the cross are all my hopes —  
Thou hast not spared me aught:  
Yet, raised thereby above the world  
Its treasures count as naught:  
Empty its titles and its show,  
Its honours and its fame;  
Better the love of God to know  
Than riches, rank or name. [Page 21]

Two avenues there are, 'tis said,  
From paltry passions vile —  
From all calamities of earth —  
From artifice and wile.  
Science and Art their votaries lead  
From quicksands and from shoal;  
Their guiding torches held aloft ,  
Will light us to our goal.

When ended this — my "time of debt" —  
'Tis only Thou canst know;  
But when the longed-for quittance comes  
I stay not here below.  
Till then give me the torch of Art  
To light my pathway drear,  
Let Science lift my thoughts to Thee  
My lonely hours to cheer.

But when my life-long debt is paid —  
My soul from body free —  
No bondage can enslave me more,  
For I shall go to Thee.  
Haste, haste the hour when summons comes,  
And takes me to my home;  
Here have I lived an exile's life,  
An exile forced to roam.

The face of love was turned from me  
When most I felt its need,  
And in the wilds my feet were set  
To plough and sow the seed.  
Ashes and tears to me were given;  
I sat not by the way,  
With folded hands to make lament  
But laboured day by day.

Thou hast not dealt one useless blow,  
What time I worked in field:  
Each tear of blood, each hour of toil,  
Increases harvest yield;  
And now the furrows all are ploughed,  
If I have paid my debt,  
By waters still, in paths of peace,  
Thou wilt my footsteps set.

Aeons may pass before my hopes  
For earth are all fulfilled;  
But let "*the dawn*" approach, I pray,  
Before my lips are stilled !  
And let true knowledge cover earth  
As waters cover sea —  
Knowledge of truth, knowledge of love,  
Knowledge, dear God, of Thee !

I wait the music of the spheres,  
The rhythmic pulse of earth,  
Which, when Death's angelus doth ring,  
Announce immortal birth:  
In that blest home beyond the veil  
No discord rends the air —  
The law of harmony prevails  
And love reigns everywhere.