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Kepler’s Actual Discovery: Mathematics Is Not Science

This is the final, proofed release.

Kepler’s Actual Discovery:

Mathematics Is Not Science

by Lyndon H. LaRouche, Jr.

November 5, 2008

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I am, as you know, an old man, but, do not worry about me on that account; for me, being old has sometimes had some very important advantages. These are advantages which include such benefits as knowing, as most leaders of society today do not, what correctable errors sent us down the wrong path of the habit-making of our society two generations or so ago. Such were the errors which caused the almighty mess our nations now seem to insist on becoming, or, even worse. This is a mess which only rare cases of the more experienced persons among us would be likely to understand today.

For example, some decades ago, I wrote, that poetry must supersede mathematics in science. Some readers, even among my close associates in scientific work during that time, were shocked by what I said, but, they failed to heed my warning; rather, at that time, most of the relevant persons, even among my political associates generally, often bungled their way ahead, rather than facing up to my challenge that they free themselves of their often misguided notions of competence.

That contaminating element of incompetence to which I refer as already extant then, was of a type which persisted even among broader circles of those leading scientists with whom I was more or less closely associated in shared advanced programs of that time. The error by most among them whom I had addressed on this matter then, persists as a crippling factor in what, unfortunately, passes for learned opinion, still today.

Therefore, the following is a story well worth telling here. It is fully as important for the grievously perilous times today, as then; and is certainly far much more so today; because, as result of that element in our past, we are now living in the most perilous times of all recent history for our planet as a whole, today.

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The Thesis:

"Es führt dies hinüber in das Gebiet einer andern Wissenschaft, in das Gebiet der Physik, welches wohl die Natur der heutigen Veranlassung[mathematics] nicht zu betreten erlaubt."[1]

—Bernhard Riemann, closing sentence of 1854 **Habilitation Dissertation**

For me, fifty years ago, the struggle involved in my first, very painstaking reading, and re-reading through the German of Bernhard Riemann’s 1854 habilitation dissertation, was one of several such experiences in my life which have had the relatively most important, and persisting influences in shaping my world outlook, up to the present day. The only comparable, earlier experience in science, of the quality of empyreal joy of recognizing the intent of what I was reading on such an occasion, had been my first, adolescent encounters with some of the work of Gottfried Leibniz.

Then it was the closing sentence, itself, of that dissertation which delivered the crucial effect—an effect on me, as among doubtless some others, which I am fully persuaded that Riemann had intended in leaving that particular, very boldly courageous sentence to the conclusion of his address on that occasion. Riemann had already recognized the danger to society in attempting, as the empiricists had presumed, to substitute mere mathematics for actual science. The specific effect which that concluding sentence had on me, was rooted in the fact that that was the necessary outcome of the same Riemann dissertation’s two opening paragraphs. This configuration defined: a relationship between those two "bookends," the one at the outset, and the other in the close of that same composition, were the likenesses of the opening and close of a great play, in defining the meaning of what lay between them.

I urge the informed reader to recognize that crucial aspect of the whole matter, now.[2]

Since that experience, I have enjoyed a confrontation with similar qualities of discoveries of principle, but none of them as profound for me as these two most fundamental discoveries from the work of Leibniz and Riemann. Even Kepler’s uniquely original discovery of universal gravitation had less impact upon me, not because it lacked fundamental importance, but because I had, already, adopted the same principled conception of man’s knowledge of the universe from Leibniz and Riemann, at the time I had first read Kepler’s **The Harmonies** seriously, about what is now about three decades ago.

It should be recalled by any person familiar with what became, over decades, my customary argument on the subject of method, that on all relevant public occasions, I had always insisted on locating the reality of experienced knowledge in the process of generating a conception, rather than in what usually seemed to pass among others, for the simple "bottom line" on the relevant topic. Reality is not where one had been dumped by a trolley-car conductor at the end of a line; it lies within the process by means of which you, for example, might have discovered the meaning of that way which leads toward that destination.

Therefore, as I shall emphasize in this report, my experience with those discoveries taken from Leibniz and Riemann which I have referenced just above, should warn us, that, in matters of science, in particular, we must look beyond not only the realm of mathematics, but, also, even the much higher realm of physical science as such. We must reach toward that concept of the very existence of the universe itself, on which our comprehension of the possibility of the existence of the uniqueness of that universe depends.

Such is the experience of knowing the meaning of Johannes Kepler’s own uniquely original discovery of the principle of universal gravitation.

On account of similar experiences during the years before the crucial experience of my early-1953, initial settling of accounts with Riemann’s habilitation dissertation, I had had experiences in other domains which were similar to that electrifying reading of Riemann. This experience with those other domains included certain encounters with the poetry of John Keats and Percy Bysshe Shelley which are, in fact, relevant to the notion associated with the referenced, concluding sentence of Riemann’s dissertation.

Among such relevant other items was, most emphatically, such a grand experience as that of the concluding, fairly long paragraph of Shelley’s **In Defence of Poetry**, in which Shelley had summed up, with the most elegantly poetic expression of profundity, his view respecting "the power of imparting and receiving the most profound and impassioned conceptions respecting man and nature." What Shelley wrote there, in the paragraph as a whole, corresponds to my entire retrospective and prospective view of the proper organization of our attempted insights into the dynamics of the social processes of human experience and development.

It was the convergence of my sense of things respecting both such fundamentals of physical science, and of great Classical poetry and drama such as that, which has defined the heart and mind of my conscience, from my adolescence, through today. For me, as I emphasize in the two chapters which follow these introductory remarks, this recurring, life-long experience of mine goes to the heart of what I am, personally, most passionately committed to convey to the benefit of coming generations, including the promise of that which awaits them, emergent, as within some parts of the young adult generation of the present moment.

A Certain Crisis in Science

So, consequently, on the occasion of a meeting convened at Ibykus Farm back during the mid-1980s, I shocked the assembled scientists of our international Fusion Energy Foundation (FEF), by insisting that the problems of physics which were confronting us then, must be addressed by aid of attention to the details of Kepler’s discovery of the principle of universal solar gravitation. I situated my argument to that effect, in the domain of my special competence as, as, in effect, already, then, a leading physical economist of the world today. Such was my tested competence in a Riemannian science of physical economy. Most among those assembled at that meeting had been enraged by my introduction of this as a matter of policy, excepting, from a somewhat older generation, Chicago’s celebrated Professor Robert Moon.

That rage, from many at that table, expressed, essentially, a knee-jerk reaction to any attack on what had been presumed by them, academically and similarly, to have been the absolutely sacred utterances of the Black

Magic specialist, Isaac Newton. For them, Newton was deemed almost sacred among true believers. The believers included many otherwise competent scientists of outstanding accomplishment, but, nonetheless, still victims of youthful classroom indoctrination in what had been built up into the form of a shabby cult-ritual around that dubious English creature.

In retrospect, looking back over the twenty-odd years since that particular FEF meeting, I had been completely correct in every feature of what I delivered, on the point of my argument then. The relevant evidence re-examined, repeatedly, in recent times, has shown my argument, then, to have been thoroughly sound.[3]

Notably, the rage expressed when the same matter came up again during two subsequent meetings of the FEF, although considerably lessened, showed evidence that a large part of the such errors spread among scientists at that time, and still today, are a reflection of the fact that the generation of scientists produced from among returning World War II veterans had studied virtually nothing of Kepler’s actual work. Most among them knew almost nothing about the way in which the deepest issues of modern science, which had been posed, uniquely, by those kinds of discoveries typified by Kepler’s own, had been fraudulently put aside during the centuries, put aside despite the **De Docta Ignorantia** of the actual, Fifteenth-Century founder of modern physical science, Cardinal Nicholas of Cusa.[4]

This same, inherently destructive error by my own critics, within FEF and elsewhere during the 1980s, and, again, now, lies in what they copied from the Newton cult’s libels against Kepler. The influence of that same philosophically reductionist cult traced from Wenck, Zorzi (Giorgi), Fludd, and Sarpi’s lackey Galileo, is a tradition which persists today, usually in a more vicious form today than that of the past. The folly of that cult is now a tradition which has been formed under the influence of the far greater decadence which has been recently accumulated in the dogmas and expositions among leading academic institutions. Such has been the effect, for science and science education today, which is to be recognized in the tattered condition of higher education today, since the passing away of most among the representatives of three adult generations of matured adults, including the two preceding my own.

Those have been three generations which had represented a certain quality of relative scientific competence which has been largely lost, or threatened with virtually total loss, today. These three past generations, whose existence as a group of three generations, is dated largely from about the beginning of the Twentieth Century, still represented a repository of some degree of "pre-68er" relative competence. Theirs was a competence, if sometimes a bit damaged epistemologically, which was relatively commonplace among professionals, still a generation ago, before the takeover of almost everything by the continuing, corrosive effects of the 1968 insurgency of the virtually Dionysian cult of the "post-industrial" age of "globalization."[5]

The most notable feature of the post-1968 process of accelerating moral and intellectual degeneration of modern academic and related institutions, had been its nature as a successor to and an outgrowth of the successive steps toward utter degeneracy in the teaching of science marked, at the close of the Nineteenth Century, by the decadent "mechanics" of the positivist Ernst Mach and his immediate followers, and, then, the numerologists’ Twentieth-Century lunacy of the cult of Bertrand Russell, and of such among the devotees of Russell’s sordid **Principia Mathematica** as Norbert Wiener and John von Neumann.

The spread of the existentialist, deconstructionist cult into its currently prevalent form of utter moral depravity, would not have been sustainable to this effect, had the natural forces of opposition to unreason not been corrupted in that way. Typically, that corruption is symptomized by the fact, that today’s source of that incompetence which is illustrated, typically, by principal objections which have been employed against Kepler, is to be found in the intentionally justly derogatory implications of Friedrich Schiller’s use of the term, **Brotgelehrten**. For example, for the generation of students entering universities during the terms of President Truman, or later, the intent to be awarded their degrees, and to secure advances into post-graduate employment, were frequently overriding concerns. "Truth?" "Yes, of course," they say, "whenever possible; but, you have to be practical, if you do not wish to risk your career." The sophistry of the high priesthood of Old Babylon was always the nastiest phase of that ancient society’s successors.

That sort of corruption of the body of academic and related practice of physical sciences goes on, and on, and on, worse than ever, since then, today. Some of the worst has been encountered lately among the faculty at Harvard University; but, corruption of a similar quality is also pervasive in today’s relevant institutions.[6]

So, whereas that sort of corruption already existed, in a milder form, among what were otherwise useful scientists twenty or more years ago, the prospects for competence in scientific practice today, under the corruption now represented by the acute mental disorder of the "68ers" pestilence of so-called "environmentalism," are often catastrophic.

Among the older representatives, among even the same circles still associated with me today, the case is, that excepting the independent type of young adults of university age typified by those who have been engaged recently in programs such as my "basement" projects, there is virtually no sign of oncoming new waves of scientific competence in the matter of method as such, in the U.S.A. or western Europe today; the very worst, is to be found usually among the digitalized devotees of "information theory."[7]

As some would say, when reflecting on the state of the world economy today, "Kissing buttocks may yield academic honors and (temporarily) well-paid appointments, but does not promote insight into times ahead."

In any clinical study of the direction and rate of degeneration of the teaching of physical science, for example, over the recent forty-odd years and longer, we can not overlook the shift from a productive economy, to a "post-industrial" state of general intellectual and moral rot of the minds and habits of physical-economic practice of what are considered the "best professionals" of our economy of the present time.

In Cusa’s Time, and Ours

Thus, that decay among professionals which has become representative of prevalent opinion and practice around the professionals of academia and kindred locations today, occurs as the pervasive decadence of the recently prevalent trend, downward, in our society’s widely accepted standards of opinion. This downward trend is expressed by the view that there is no possibility of rescuing civilization from a post-industrialist’s recently accelerating rate of destruction of a civilization now nearing a terminal phase of disintegration. Despite the issue which I had posed, during the mid-1980s, respecting an attempt to return to the founding, as by Kepler, of a competent comprehensive form of practice of modern physical science, there is apparently scant chance, today, for a resumption of civilized life on this planet, for generations yet to come.

However, while the foregoing is a true statement of the recent trend in the state of world affairs, I am not a pessimist. I am only warning, that unless we are successful in that economic reform which I am attempting on behalf of all humanity now, a planet-wide new dark age of humanity were virtually inevitable now.

We have had dark ages of civilization in the past, and there have been recoveries from them. The Fifteenth-Century Renaissance associated with the A.D. 1439 Council of Florence and the work of Cardinal Nicholas of Cusa and his followers, is the most relevant example.

In the broader sense of the matter, all competent forms of modern physical science are typified by the case of that Filippo Brunelleschi who introduced the physical principle of the catenary function for crafting the cupola of the Florence Cathedral of Santa Maria del Fiore. It is typified, even far more significantly, by the contributions to fundamentals by the Cardinal Nicholas of Cusa whose **De Docta Ignorantia** launched all competent specification of method for modern physical science. Although Luca Pacioli and Pacioli’s student Leonardo da Vinci continued the legacy of Cusa with some brilliant steps forward, a competent general practice of modern physical science itself, is rooted in the methods employed by Cusa follower Johannes Kepler, as in the original discovery, as in the **Harmonies**, of the principle of universal gravitation around which the Solar System is organized.

The universality of Cusa’s mind required an experimental discovery of some specific, universal physical principle to match the far-sighted outlook of that mind. The uniquely original discovery, by Johannes Kepler, of a universal principle of gravitation governing our Solar System, provided that successful experiment.

Against that historical background, Kepler’s discovery of a general principle of gravitation, as in his **The Harmonies of the World**, has an exceptional significance today. It is a significance emphasized afresh by Albert Einstein’s emphasis on the fact that all competent physical science today depends upon comprehension of the specific act of genius by Kepler, on this account.

By contrast, the assertion that gravity was discovered by Isaac Newton, has been typical of not only the greatest frauds against science in modern history, but of the capacity for corruption and stupidity even among what are reputed to be the best educated personalities of our time.

That said, I will now yield to others among my young associates the honor they have earned for their elaborating afresh the case for Kepler’s discovery, in detail. I have made the point respecting Kepler’s work repeatedly over a period of decades. My young associates have made the point, independently, in their own work. My adopted task here, is to provide certain crucial remarks, pointing toward the seed-crystal of the relevant argument, *with emphasis on the specific argument respecting the root of science to be found, still today, in the Classical poetry of two adult generations earlier*.

In this location, below, I summarize the most crucial, and, also, the least understood, but most essential feature of Kepler’s discovery of a principle of universal gravitation. I follow that part of my summary, by a related, relevant summary of the case proving the absurdity of the presumption of the existence of some categorical separation of physical science from competent expression of Classical artistic composition.

Considering my age, I complete this report, and thus leave it to younger generations of promising talent to transmit and to enrich, in improved detail, what we have achieved thus, on this twofold account, so far.

1. KEPLER’S WARS AGAINST VENICE

The essential key to the solution which led Kepler to his uniquely original discovery of a principle of that universal principle of gravitation underlying the organization of the Solar System as a whole, was his recognition of the elementary irony posed by the contradictory effects of, first, examining the organization of the Solar System from the standpoint of a quasi-Euclidean idea of vision, and, then, examining the same motion from the standpoint of the harmonically ordered composition (hearing) of the relationships-in-motion of the Solar System as a whole.[8]

The systemic incongruities of the two dominant modes of human sense-perception, sight and hearing, guided Kepler to discover the principle on which all competent modern science education, and also Classical modalities in modern art, depend: *the recognition that the mere mathematical portrayal provided by sense-perception, is, at its best, the mere shadow cast by those true scientific principles which lie, ontologically, outside the domain of that which could be known through the formalities of mere mathematics.*

What is truly most important for science today in Kepler’s discovery of universal gravitation (within our Solar System) on this account, is the implications of posing the discovery, to ourselves, of the notion of our ability to understand the organization of both inorganic and living processes, such as the *non-digital* principle of human hearing, as this experience is associated with the function of counterpoint, as discovered, uniquely, by J.S. Bach, existing within the presently known bounds of our Solar System today.[9]

This discovery of a universal gravitation of the Solar System, by Kepler, demonstrated the systemic absurdity of all assumptions to the effect that the universe is organized according to the notions of simple sense-certainty. Kepler did that in the most profoundly comprehensive, and conclusive way. All competent approaches to matters of essential principle since that discovery by Kepler, depend upon locating the principle of reason which governs the universe *ontologically* in the human mind, such as the mind of Helen Keller, rather than the mere senses. That is what is reflected in the genius expressed in common by Max Planck and Albert Einstein, in their opposition to the frauds of the respective followers of bad Ernst Mach and far worse Bertrand Russell.

The essential point to be recognized in reading Kepler’s uniquely marvelous stroke of genius in that discovery, lies in the fact that, for the first time in modern science, he, as a follower of Cusa and Leonardo da Vinci, and also Brunelleschi, had directly challenged that superstition, called sense-certainty, which had been the leading obstacle to the successful development of scientific method in European science, since the fraud of the root-method of **Euclid’s Elements**. Euclid’s is the same fraud spread otherwise as the notion of allegedly "self-evident" presumptions respecting the nature of the human powers of sense-perception, which has come to dominate the classroom in modern secondary and university education today, British neo-Ockhamite empiricism most notably. The point is, as Albert Einstein was to emphasize later: he challenged this matter in a truly universal way.

Kepler’s attention was aimed at the paradoxical lack of systemic coincidence between two sensory aspects of the observed evidence which astronomy laid before him: *vision* and *hearing*.[10] It is fairly stated that both of these senses, like all aspects of human sense-perception, do not present us reality directly; rather, like all good scientific instruments, they present us with *evidence bearing upon what should have been our desire to be shown the existence of ontological paradoxes which the mind must then solve by aid of the tests conducted in the mode of suitable experimental method*s.

The result of Kepler’s discovery to this effect, was to shift modern European science’s concept of reality, once more, from the falsely assumed, "self-evident" reality of mere sense-perception, back to the higher domain of universal physical principles, the domain of actually efficient reality.

The first problem which Kepler had faced in his role as a follower of both the founder of modern European science, Nicholas of Cusa, and the relevance of the work of Cusa’s outstanding follower among Kepler’s own predecessors, Leonardo da Vinci, was to adopt a critical approach to the assessment of the role of those mere instruments of sense-perception which we know, in simple-minded terms, as sight and hearing. Leonardo da Vinci had revolutionized the notion of sight; Kepler was thus to be recognized as being a forerunner of the great Max Planck, in the implied development of the implications of the function of hearing (i.e., the harmonics of a Classically dynamical mode of physical space-time, including sub-atomic space-time, rather than "digital hearing" or linear "seeing").[11]

The evidence that neither sight, nor hearing, presents us with the real universe, impels us to shift our idea of reality to the higher domain, in which the notion of universal physical principles, rather than sense-perception as such, *is* recognized by the human individual mind as the location of the reality within which the human individual, his society, and the effect of his actions are actually located.

Science & Religious War

Although I have covered this in locations published earlier, we have the following.

The success of the founding of the modern sovereign nation-state had been accomplished, to a large degree, on the initiative of Nicholas of Cusa, as prior to, during and beyond the great ecumenical Council of Florence.[12] This success of the great ecumenical Council of Florence, prompted a reaction from the already resurgent, imperial power of that same Venice which had, earlier, brought the Fourteenth Century’s "New Dark Age" upon Europe through aid of the Lombard League of the Fourteenth Century New Dark Age.

In the later half of the Fifteenth Century, the ancient evil of usurious Venice was then regaining much of the predatory, usurious, political power of its financier class. It was focusing that power strategically, politically, with the intention of breaking-up the unity of leading sections of western and eastern Christianity through the special operations against targets Moscow, the Balkans, and Constantinople. This led to the outbreak of a long period of religious warfare throughout Europe, from the launching of the expulsion of the Jews from Spain, in 1492, until the 1648 Peace of Westphalia.

The motive for the philosophical reductionists’ systematic denial of the human individual’s access to that reality of cause-effect which lies beyond the domain of mere sense-perception, was the intent of the rulers of society to make virtual slaves of their subjects, by denying those subjects access to *secure knowledge of those creative powers of the human individual mind which set the human species above all other species.* So, the denial of the knowledgeable use of "fire" by the Olympian Zeus of Aeschylus’ **Prometheus Bound**, degraded mortal human individuals, as the followers of Britain’s Prince Philip and his lying lackey, former Vice-President Al Gore, do, into virtually mere cattle of the rulers of empires and their like.

There are two of today’s representatives from among the tradition of the most notable Venetian scoundrels of the Sixteenth- and early Seventeenth-Centuries’ pandemic of religious warfare, a certain Francesco Zorzi, the sometime marriage-counselor to England’s Henry VIII, and, later, Paolo Sarpi, who have a very special historic significance, still today. This latter pair’s strategic pranks against modern civilization, have been of crucial significance for understanding the roots of the types of problems which continue to afflict today’s now globally-extended European civilization: the types of problems represented by the enslavement of mankind by the Olympian Zeus’ prohibition of ordinary human individuals’ access to useful knowledge of "fire."

The first relevant case of such would-be Olympian ideological oppressors in modern European society, is typified by the case of the Venetian super-spy and bitter adversary of the work of Cardinal Nicholas of Cusa’s founding of modern physical science, Francesco Zorzi (a.k.a. Giorgi). That was the Zorzi who was crucial in the work of organizing the general religious warfare among Catholics and Protestants, an effort he conducted through aid of his orchestration of the role of Venice’s agents such as Cardinal Pole and Thomas Cromwell. The effects of this included the case of Anne Boleyn, the latter she who was used as a mere sexual plaything by Zorzi, in his special role as marriage-counselor to England’s Henry VIII, in orchestrating the division of Europe between a Protestant North and a Catholic South. The turning of England in this way, was crucial in the perpetuation, and spread of the religious warfare which would not be ended until the signal intervention by Cardinal Mazarin into the process which became known as the 1648 Peace of Westphalia.

The second case, of more immediate importance than Zorzi for today’s modern scientific and strategic controversies, is the Paolo Sarpi who is the true father of British imperialism and of the evil it has spread throughout the world, down to the present day.

Both of these odious creatures, Zorzi and Sarpi, played crucial contributing roles in the crafting of that corruption of European science and morals known as British (or, better said, "Brutish") imperialism and empiricism. On this account, Zorzi is notorious for the attack launched in his **De Harmonia Mundi** (A.D. 1525), which was his attack on Nicholas of Cusa’s **De Docta Ignorantia**. (A.D. 1440). Zorzi’s attack was conclusively rebutted for physical science, later, by Kepler, in Kepler’s **Harmonies of the World**. The fresh attack, then, from Sarpi’s version of irrationalism, is the most significant for history since the close of the Sixteenth Century.

The key to understanding the physically strategic significance of the difference between the modern Aristoteleans and Sarpi, is to be recognized in the effects of the unleashing of a limited degree of technological progress in social relations and productive powers of labor by Sarpi’s followers, who thus attempted to catch up with some of the strategically significant technological advantages which had been the immediate result of the scientific revolution launched in Florence through the work of Brunelleschi, and, more emphatically, Nicholas of Cusa. The strategically crucial issue here, is the scientific and technological superiority of a culture rooted in science, over the sterility of both the Aristotelean tradition, and the surrogate for Aristoteleanism met in the mystical reductionism of the empiricist, positivist, and existentialist followers of Paolo Sarpi: *modern philosophical Liberalism.*

The Great Lie of Liberalism

Thus, until Sarpi’s emergence as a leading power of his faction, in the wake of the Council of Trent, the most crucial strategic weakness of the Venice-directed campaigns of war against the modern nation-state, had been

the crippling effect of the influence, on the Venetian cause, of the Aristotelean argument copied by the *a-priori* presumptions of Euclidean Geometry. This was the argument which had been crucial in blocking scientific-technological progress, and therefore strategic capabilities, among the so-called Catholic faction.

Sarpi’s strategically crucial innovation was his evasion, if only in a relatively significant degree, of the self-inflicted problem of stagnation, inherent in Aristotle’s doctrine; this is the relative weakness which Sarpi overcame partially, through a swindle, his resurrection of the teachings of a medieval irrationalist, William of Ockham (Latin: Occam).

Sarpi’s adoption of Ockham’s irrationalism allowed Sarpi’s Venetian faction some latitude for the strategically significant, mechanistic application of technological progress, but, at the same time, relied on Ockham’s principle of obscurantism to prevent the spread of knowledge of the actual scientific principles. This specific kind of irrationalism permeated Sarpi’s adoption of Ockham; this form of systemic irrationalism became known as empiricism, or modern Anglo-Dutch Liberalism. So, Sarpi bent the law of anti-creativity associated with what Aeschylus had treated as the Olympian Zeus, but without actually violating that characteristic principle of ancient and modern Euro-Asiatic oligarchical systems.

The specific types of frauds which the followers of Sarpi employed for methods of suppression of knowledge of the discovery of actual principles of science, are typified by the Anglo-Dutch Liberal empiricist’s fraudulent suppression of the evidence of Kepler’s actual, uniquely original discovery of the principle of gravitation. Later, from the second half of the Nineteenth Century, more radically irrational forms of empiricism were adopted by the Liberals, as this was typified by the followers of the positivist Ernst Mach, and, then, Bertrand Russell. The claims for discovery of gravitation by Isaac Newton, are entirely a product of those deliberate, pagan, quasi-religious frauds of the empiricists, frauds presently dominant in many university science departments to the present day.

The more general outcome of the kinds of empiricist frauds spread by the followers of Sarpi in modern university programs, has been the substitution of mathematical formulas for actual discoveries of principle — *the substitution of shadow (the mathematical formulation) for substance (the crucial experimental experience).* As in the case of Kepler’s discovery of general gravitation in the Solar System, the actuality of the action of gravitation is expressed in terms of a quality of infinitesimal which is to be defined as ontological, rather than mathematical in nature.

Einstein’s Truth

In opposition to the pagan religious fanaticism of reductionist cults in the tradition of Sarpi, the standard Twentieth Century argument for defining Kepler’s unique originality in the matter of the historically actual discovery of Solar gravitation, is that which was made by Albert Einstein. I restate that case as I have identified it in earlier locations.

The great difficulty which had been introduced to weaken, intellectually, the astrogation-based science (e.g., *Sphaerics*) of the great ocean-going cultures which colonized the Mediterranean region’s emergence, since about 17,000 B.C., from the long glaciation of the period, had been the turning away from the earlier discovery of great physical principles "enclosing" the dynamics of the stellar map, by, in effect, imposing a "land-lubber’s" virtual "flat Earth" map in place of the stellar one of leading, ancient, ocean-going maritime cultures. The Sophist’s imposition of the *a-priori* definitions, axioms, and postulates copied into Euclidean geometry, typifies this degeneration of science to levels below those of the *Sphaerics* of earlier, higher forms of maritime-inspired civilizations. Thus, instead of treating the universe as enclosed by great universal principles, as much of the idea of geometry as survived from the great mariners’ science, was subjected, by aid of Euclid’s a-priorism, to the crude sense-certainties of the local, brutish land-lubbering lout, or his incarnation as a modern British landlord.

The evidence of ancient known calendars, attests to the role of the containment of the visible universe by known quasi-spherical cycles of up to very long periods of tens of thousands of years, and even higher orders of magnitude.

Instead of proceeding from the stellar universe, downward to the locality, the Sophist pseudo-science had demanded that the Heavens submit to the dirt-bound view of the Heavens as an extension of the immediate horizon of the flat-Earthers’ individual vision. Hence, the defective, *a-priori* presumptions of Euclidean geometry and the like.

From the considerations just so stated, a panorama of implications emerges for the thoughtful observer. Most important, the evidence of ancient calendars attests to the human mind’s ability to adduce great principles of long span as enclosing the stellar system. This tells us something much more than the related evidence of modern astronomy. It shows us that the mind of the human individual has been capable, for as much as hundreds of thousands of years, in adducing great principles controlling our universe, "as if from the outside," that done through the agency of the cognitive powers of the individual member of the human species.

In other words, the ancient, medieval, or modern believer in Euclidean geometry’s notorious *a-priori* "principles," is to be considered either as a hoax, or the outcome of a degeneration of human culture relative to what are for us today extremely ancient times—both options being pretty much the same thing, in effect.

This brings us back, directly to what Albert Einstein recognized as the authority of Kepler’s uniquely original discovery of the principle of universal gravitation controlling the organization of our Solar System. It points directly to the absurdity of adopting the assumptions of a Euclidean geometry as the foundations of an empirical body of physical science.

What did the modern Einstein say about the unique discovery by Kepler, to this effect?

Einstein’s argument assumes the form of pointing out that that infinitesimal of that Leibniz calculus, is not a *mathematical* infinitesimal, but, rather, an *ontological* one. The smallness of the infinitesimal of a Keplerian space seen by Leibniz’s calculus, is as "small" as the inversion of the universal physical principle which it reflects. So, as Einstein demands, the universe as a whole is self-bounded by the set of universal physical principles of which it is composed.

The further conclusion is, that the universe is finite in this sense, although we can not presume that its evolution is *ontologically* finite in the larger, reductionists’ sense of finiteness. We can not presume that the universe is not negentropically finite, rather than of a simply fixed finiteness. Hence, Einstein, in praising Kepler as the implied founder of modern Riemannian physical science, identified the universe as finite, but unbounded.

Helen Keller’s Science

This brings our attention back to the ironical juxtaposition of sight and harmony, in Kepler’s uniquely original discovery of a solar principle of harmonically ordered universal gravitation: a Solar System bounded, externally and internally so. The senses of sight and harmonics are employed, but neither "contains" the phenomenon of gravitation *ontologically*. Sight and harmonics are merely "instrument readings," but not, in themselves, ontologically, that whose effects they measure.

This is true for all our sense-perceptual experience, and the same notion extends to all of the instruments which we synthesize for exploring the universe in the astronomically extremely large, or in the microphysically, subatomic small.

All really intelligent people in the practice of science are therefore those who may be fairly described as creatures of *sense-uncertainty*. We know the universe, not through sense-perception as such, but through appropriate experimental methods akin to those of ancient mariners adducing the efficiently ontological actuality of the demonstrable, measurable, so-called "universal" periods of the astronomical system.

To restate the most crucial point, we come to know the real universe as the outcome, for our mind, of the specific type of experiment which has universal authority in the same general sense as the ancient trans-oceanic mariners recognized the cycles which contained the universe within which they dwelled.

What we discover in that way—what we may rightly term "universal physical principles," or the like—become the means of our power to influence our universe creatively through knowing the universal principles which regulate its existence. Our power to exist, as a human species, distinct in essence from all forms of mere animal life, lies obviously in our willful assimilation of knowledge of the principles which are universal, in the sense that they, like the universal gravitation discovered, uniquely, by Kepler, are the power provided to the knowing, to act in ways which change the behavior of the universe we inhabit.

So, the relevant LYM teams of researchers discovered the principles of physical science which I had defended, earlier, against many erring scientists, both in the Fusion Energy Foundation sessions, and in principle otherwise, as once more, here, today.

2. POETRY AS SCIENCE

A conception which was subsequently proven to be very important, began for me back in 1947. I was strongly provoked by the effects of my reading of, and the consequent intensive debate within myself, concerning, the revised edition of William Empson’s celebrated **Seven Types of Ambiguity**,[13] a book which I had purchased at a bookstore which I frequently visited off Boston’s Copley Square. In the end, I was "provoked by" would be the best description of that encounter with Empson which I might present to today’s audiences. I came, thus, to recognize the indispensable role of the modes of Classical artistic composition in reaching a true insight into the most essential features of physical science.[14]

My reaction to that book of Empson’s, had been shaped by my earlier, adolescent and later engagement with the works of Shakespeare, Keats, and Shelley. Still later, my understanding of the significance of the crucial role of Kepler’s insight into solar harmonics, settled matters respecting the coherence of the principle of physical science with Classical artistic composition.

I had first become familiar with the work of these poets during my adolescence, from approximately the age of fourteen, onward; but, in the immediate post-war years, I read these afresh, and Empson, too, with increasing emphasis on that same modality, called Classical irony, which conductor Wilhelm Furtwä ngler sometimes described as reading (and performing) from "between the notes." By "between the notes," I would suggest, as illustration, a comparison to the implications of experiencing a well-staged and directed performance of the situationally ironical opening quartet of Beethoven’s **Fidelio**. This is truly Beethoven’s mastery of the creative principle of irony in his expressed approach to composition. Without the irony of the juxtapositions of the mutual misunderstandings of the characters playing those parts, there could have been, technically, nice music, but, actually, no opera to have inspired the composition of **Fidelio** by Beethoven.

Important ideas reside not in the attributable literal intention of words and phrases, but in the irony which transports the mind’s perception of the intended meaning to something which is not a deductive form of literal meaning. *Thus, the* **New York Times’** *comma-sparse style-book prompts the reader to proceed at highest speed without being obliged, by the author—or a keyboard artist, to pause for actually thinking.*

The combined effect of my adolescence’s fascination with Classical works, and the excitement provoked in me by both discovering the principle of genius in Furtwä ngler’s conducting,[15] and what prompted me, under conditions of my preceding, war-time experience, and my 1947 encounter with Empson’s work, as a matter which prompted me to reopen for consideration: sparked a genuine revolution in fostering what became my rounded world outlook from that time, onwards.

In Classical Drama

All great individual minds have been the stages of a theater of the mind where the great dramas written by the spirit of Classical poetry could be performed. In most serious thinkers whom I have known well enough to recognize such distinctions, the outlook on reflections of both physical and social processes, has tended to develop in a way which unites the two kinds of subject-matters into an at least approximate, single, coherent world-outlook.

The best illustration of such connections is found in reflections on the principles to be recognized in thinking about the way the Classical stage, Classical artistic composition, and Classical poetry, inform what tends toward becoming a deepening insight into all aspects of human individual and social mental life.

Notably, for our purposes here, all great Classical composition and performance of performing art opens with the presentation of a virtual statement of the global bounds of that in which a crucial germ of irony is presented as included. Take the example of the roles of Papa Rocco and Fidelio herself (Leonore) in the opening quartet of Beethoven’s **Fidelio**. Another among the most magnificent examples of this principle, is the first part, **Wallenstein’s Camp** of Schiller’s **Wallenstein** trilogy, or the opening statement of a great Bach or Beethoven composition. An adequate comprehension of the working implications of what I have just stated here can be adduced by closer examination of these and kindred cases.

In drama situated in real history, which Schiller’s fidelity as an historian illustrates, the principled notion of development is shown in such cases as **Don Carlos**, **Jeanne d’Arc**, and **Wallenstein.** The Classical historian-dramatist’s intention is never the production of entertaining fiction, nor silly homilies in the alleged service of "morality." As I have emphasized the point for the case of the Homeric **Iliad**, the essence of all effective Classical drama, is to use the audience’s powers of imagination to unmask the ghost which is the guise adopted by the corrosive principle of true tragedy. This is never the Romantic’s silly idea of the "failed individual hero," but the systemic quality of moral failure of the society itself, a failure merely expressed by the doom which the society itself imposes upon that notable individual figure who does not cause the tragedy, but, rather, lacks that will, personal integrity, and insight which he, or she would have needed, to overturn the doom which his, or her submission to the society’s own popular culture has demanded of the leader which it has preferred, and, thus, doomed, for that society’s sake.

In the history of the U.S.A., for example, the recurring assault on our republic by the tragic principle, takes the principal form of ensuring, often successfully, that intellectually and morally failed persons will be brought in to occupy the Presidency itself. The miracle of the U.S. Constitution is that the republic has survived, so far, despite inherently failed Presidents such as, most conspicuously, Richard Nixon, Gerald Ford, Jimmy Carter, George H.W. Bush, and George W. Bush, Jr.

The power to resist such corruption as those Presidents, or nephew-of-the-Confederacy Theodore Roosevelt, child-of-the-Ku Klux Klan Woodrow Wilson, the Calvin Coolidge who exhibited the prudence to shut up, Herbert Hoover, or the corrupt Andrew Jackson, Martin van Buren, or Polk, earlier, argues for the special virtue of a Constitution which is not a collection of do’s and don’t’s, but a systemically thorough expression of a single, universal principle, as identified, most emphatically by the systemically anti-Locke Preamble of the Federal Constitution, a Preamble which represented a sacred devotion to defeating the great evil which dominated the world of that time, our great foe, then and now, the Paolo Sarpi heritage’s "Brutish," Anglo-Dutch Liberal Empire.

The Principle of Tragedy

To state the case briefly, the root of tragedy is the element of systemic bestiality specific to certain human cultures. The brutalized mass, which has been subjected to the quality of reign which the beastly Olympian Zeus of Aeschylus’ **Prometheus Bound** prescribes for mortal mankind, is the source of the depravities and threatened doom of entire cultures which submit to that notion of a beast-like, seeming changelessness of the principled characteristics of popular traditions.

In such a depraved society, tradition, as expressed by the Olympian Zeus or the Delphic cult of Apollo-Dionysus, prescribes the intended doom of those prospective leaders of society who resist submission to the imperative expressed, as against Prometheus, by the Olympian Zeus, or the Delphic priesthood of Apollo, or the Pythian priesthood’s weird incantations. Such is the world of self-inflicted doom portrayed by the **Iliad** and of the Classical Greek tragedy generally. It is that culture itself, which is the systemic criminal of the tragedy.

The tragic figure in Classical drama, and in real life history, too, is not the individual, but the society which holds that individual brutally in its grip. The true hero, is he, or she who violates that popular custom which is, itself, the true villain, the virtual Iago, of that history. The intellectual *castrati* of society tend to breed defective children, and then wonder, "Why?"

Christianity, for Example

Hence, in authentic Christianity, it is the freeing of mankind to become mankind truly, through throwing out the devils which reign as do the gods in the **Iliad**, which is the spirit of man’s experience of resurrection. So, what is most fairly identified today as "The Brutish Empire," is the singularly best example of pervasive expression of evil today.

So, this taken into account, what appears, if only in the opinion of the brutishly insensitive opinions of the ignorant members of the audience, to be the failed hero, is actually an imagined figure who is often all too typical of the pervasive moral failure permeating the institutions and population of that entire society. It is the, contrary, exceptional figure of great Classical drama, like the quality of leader represented by the exclusion of the legendary and real-life Cicero of Shakespeare’s **Julius Caesar**, who is key to recognizing where the tragic fault lies—not within some mere leading figure, but within the systemic features of the society thus brought on stage. Hitler did not create Nazism; the British empire of such figures as the Bank of England’s Montagu Norman brought forth Nazism out of the same British motives which had given continental Europe that Seven Years War which, in the end, had established the British East India Company of Lord Shelburne et al. as an Anglo-Dutch Liberal form of British Empire.

Nations and their people, in times of greatness, bring forth and select leaders from among them who are the essential instruments by which a people uplifts the spirit of the nation. Decadent nations perpetuate their own self-inflicted ruin by selecting mediocrities or worse as what are considered "more suitable" representatives of themselves. Such has been the essential, true internal history of our United States.

For example, in the Classical conception of tragedy in European culture since the Homeric **Iliad** and **Odyssey**, tragedy is typified by the way in which the whisperings of the Gods and demi-Gods, excepting the figure of Athena, typify the way in which the mortal folk among the figures on stage are induced to cause their society to doom itself by the influence upon them of the whisperings of those conspiring gods and demi-gods, like the whispering Iago of Shakespeare’s **Othello**. It is the whispering gossips of popular culture and custom among the people, which induce the tragic outcome, just as a nation’s majority may be induced to elect the President whose very nature, will mislead those who have chosen him, to their own doom.

For example, it is the clear fact of history, that it was the British who actually, intentionally created Adolf Hitler, as what founded the victory of Britain through that Seven Years War which had created the British Empire itself. Hitler was a disease, but it was the British system which created, and intentionally deployed that disease, as it, as represented lately by the Fabians of the lying Tony Blair government associated with the David Kelly case, have deployed my own and Africa’s personal, typically lying, and mass-murderous Fabian and related enemies in the tradition of H.G. Wells and Bertrand Russell, still today.

In the crafting of the composition and performance of great Classical drama, the playwright creates a special universe, as, for example, Leonardo da Vinci creates space. In this space created on stage at the outset, the germ of an unfolding crisis is presented, as in the instance of Papa Rocco and the Leonore disguised as Fidelio. In good direction and performances, the lifting of the curtain shifts the attention of the audience’s mind from

figures on a stage, to the costumed spirits acting within a self-bounded universe, a universe of the imagination, bounded in a space and time all its own, but, as Percy Bysshe Shelley pointed out, in the likeness of the true spirit of actual history. Through the imaginations of the members of the audience, and the audience as a dynamic of its own, thus provoked, the development of the idea of true history, unfolds.

Thus, as Friedrich Schiller emphasized, the citizen enters the theater as an individual in his society, but leaves it a better citizen.

This is not fantasy, but the calling forth to the powers of the mind to see and feel the passions which move the souls of the phantoms on stage. The purpose of this device, is to guide the mere members of the everyday audience to see the real world of the mind in which they actually live, the world, usually unseen, but present, in which the fates of nations are decided.

In physical science, the same principle is illustrated by the role of dynamics, as dynamics was defined for physical science, most notably, by Gottfried Leibniz and Bernhard Riemann. A Classical drama, or the composing and performing of a qualified Classical musical composition’s Bachian counterpoint, requires that element and its function within a coherently composed and performed composition which selects each ostensibly isolable element of the drama according a unifying concept of the development of the composition as a whole.

The celebrated "To be, or not to be," opens Hamlet’s monologue as a dialogue within himself. The two elements of that opening define the characteristic motion of the entire drama of that soliloquy, and reflect the principle of all that which came before and will follow, *dynamically*. All great works for performance on the stage, or in other modes, must begin as does Part I of Friedrich Schiller’s **Wallenstein** trilogy, with the global parameters within which the entire, unfolding remainder of the drama must express its unifying principle of unfolding development. If you do not see the evil of the true history which that trilogy expresses, you understood nothing of either the intention of Schiller as a leading historian of that time, or of the history whose essence that drama expresses.

Here, within that certain wholeness with which the entire composition presents itself on the stage of the audience’s mind, lies the appropriateness of the subject of the unfolding development as a whole.

’In Defence’ of Beautiful Souls

There are two works from Classical English poetry, one Keats’ **Ode on a Grecian Urn**, and the other, Shelley’s **In Defence of Poetry**, which have affected me most strongly since my adolescence.[16] The first, for its achievement of the quality of a perfectly ironical, Classical poem; the latter, especially its concluding long paragraph, peering into the mirror of my soul.

In all valid science and true Classical artistic composition and its performance, the quality of message which sets the product of human creativity apart from the beastly creature’s emphasis on simple literal pointing, is what is called *Classical irony*.

Return, briefly, to the second leading point posed by Percy Shelley in his **In Defence of Poetry**. Here, in that paragraph considered as a whole, Shelley has summarized the principle of dynamics, as intended by Leibniz, but as applied to the higher realm of social processes, the realm of the existence and role of mankind in the universe as a whole. Look at the complementary aspect of what Shelley adds to what I had referenced from the same paragraph earlier in this location, as follows:

"... The person in whom this power [to lead society to great advances in the human condition] resides, may often, as far as regards many portions of their nature, have little apparent correspondence with that spirit of good of which they are the ministers. But even whilst they deny and abjure, they are compelled to serve, that power which is seated on the throne of their own soul. It is impossible to read the compositions of the most celebrated writers of the present day without being startled with the electric life which burns within their words. They measure the circumference and sound the depths of human nature with a comprehensive and all-penetrating spirit, and they are themselves perhaps the most sincerely astonished at its manifestations; for it is less their spirit than the spirit of their age. Poets are the heirophants of an unapprehended inspiration; the mirrors of the gigantic shadows which futurity casts upon the present; the words which express what they understand not; the trumpets which sing to battle, and feel not what they inspire; the influence which is moved not, but moves ...."

Sometimes, I think of the period of association of Goethe with Schiller; but, then, I think, at other times, of another side.

Here, in poetry, we sense the dynamic principle of all those discoveries which empower the individual to generate ideas of principle which move societies, and, the planets, too. Science moves planets. Classical artistic genius moves the individuals, who move the society, who will move the planets, then the stars, and then, perhaps, the galaxies, too.

[1] "This path leads out into the domain of another science, into the realm of physics, into which the nature of this present occasion [mathematics] forbids us to penetrate."

[2] To re-experience the effect which I had on that occasion, read the two opening paragraphs of Riemann’s dissertation, and then skip to the concluding sentence with which he ended. Then, after absorbing the impact of that, read what lay between. As in Classical drama, poetry, and Classical musical composition according to the principle of J.S. Bach, defining the space within which the development lies, defines the outcome of that which is developed within.

[3] As the argument against the Leibniz calculus from the Eighteenth-Century empiricists, such as D’Alembert, Euler, and Lagrange, typifies the case, empiricism, in fact, permits no explicitly mathematical consideration of a universal physical principle’s impact upon the process of society considered as a whole. As financial accounting and related aspects of economic practice illustrate the point, today’s taught mathematics permits no efficient consideration of this role of universal physical principles. This has been a crippling feature in the attempt of many professionals to assess the impact of fundamental discoveries of physical principle on the increase of the physical productivity of investment of science on labor, infrastructure, and other matters of crucial importance. My argument was a proposal to address the principled implications of any science-driver program.

[4] First, by John Wenck’s **De Ignota Litteratura** (circa 1442-43), but, later, the modern attacks on Cusa’s founding of modern physical science had come from a figure otherwise notorious as the Venetian marriage counselor to England’s King Henry VIII, Francesco Zorzi (a.k.a. Francesco Giorgio). Zorzi played a leading part in breaking the peace of Europe among Spain, France, and England during that time. The third notable attack came from the circles of Paolo Sarpi. The modern attack on Cusa and the work of Kepler copies the attack from the followers of the medieval irrationalist William of Ockham, the circles of Paolo Sarpi who founded modern empiricism.

[5] The "birth" of that "68er" phenomenon is to be located in the correlatives of the founding of the existentialist forms of moral and intellectual depravity associated with the London-steered founding of the radically existentialist (e.g., Dionysian) Congress for Cultural Freedom, under British direction, in Europe, and the launching of the existentialist depravity of Theodor Adorno and Hannah Arendt in the United States.

[6] See LPAC website feature **Harvard Yard**, www.larouchepac.com.

[7] The progress of systemic devolution in the evolution of modern European scientific method has proceeded from the original empiricism of Paolo Sarpi and the hoaxster Galileo, into the rise of mechanist hoaxes such as those associated with the positivist Ernst Mach, to the nadir of radical reductionism represented by the numerology of such followers of the virtually Satanic Bertrand Russell as Professor Norbert Wiener and John von Neumann.

[8] Famously, e.g., the very idea of a "three-body paradox" in a Solar System viewed by Laplace et al., (a problem which does not exist for Kepler’s Solar System) is a devastating proof that Laplace’s method, and that of his associate, Cauchy, and such followers of Cauchy as Clausius and Grassmann in the theory of heat, is itself a fundamentally incompetent one.

[9] This implies that the concept of the Solar System, as such, must be extended to incorporate the relationships commonly underlying the respectively inorganic, living, and human cognitive functions within that Solar System (and beyond). This is implicit in the view of a Kepler-Riemann universe by Albert Einstein, and also in the work of Max Planck, as Planck’s work is antithetical to the Mach-Russell positivist perversions of the Platypus-like images of "Quantum mechanics,"—the case of the curious hybrid, Russell, called "the scientist who quacks."

[10] E.g, the absurdity of presuming that digital recordings could ever replicate actual music.

[11] A relevant account of the work of Max Planck and his notable adversaries in science has been supplied recently by Caroline Hartmann for the occasion of Planck’s 150th Birthday ("On Honesty towards Nature," Wiesbaden: **Neue Solidarität**, 18:2008). The frauds against Planck by, first, the followers of Ernst Mach, during the period of World War I, and the later frauds by the circles of Bertrand Russell, are a relevant subject for those wishing to follow up my discussion here. Classical dynamics, as introduced to modern science by Leibniz, in the 1690s, references the Pythagoreans and Plato, and anticipates Riemann, Max Planck, and Albert Einstein. On this account, the absurdity of such as Euclid, Claudius Ptolemy, the modern empiricists, and the pathological cases of the followers of Ernst Mach and Bertrand Russell, are implicitly referenced here.

[12] **Concordancia Catholica**, **De Docta Ignorantia**, **De Pace Fidei**, et al.

[13] Empson, William, **Seven Types of Ambiguity** (Harmondsworth: Peregrine/Penguin Books, 1961).

[14] As in the composition of Classical music in the Bach, Mozart, Beethoven tradition, it is necessary to situate the subject within the universe, such as the phase-spatial universality of the specific setting within which all relevant development is contained, and with emphasis on the principled form of action of development which occurs as a process of transformation of that chosen domain.

[15] A discovery which occurred during my brief, earlier sojourn in a replacement depot near Calcutta, in early 1946. My first hearing of an HMV pressing of Furtwä ngler’s conducting a Tchaikowsky symphony changed my life-long insight into music on the spot.

[16] Sometimes, an autobiographical element is relevant. For this discussion, I reference the crucial fact, that about the time I was 13, my paternal grandmother bestowed upon me a complete set of the **Harvard Classics**. This represented a significant, if minor part of all of the comparable kinds of the sources accountable for my education during my adolescence. What proved important in this, was the way in which some of the items within that collection did more to provoke me to look elsewhere, than to shape my knowledge through reflections on the text itself: Kant, for example. Among these, Keats’ poem I found a precious stroke of genius, and Shelley a large-sized philosophical mind, a mind which can not be adequately understood today without assimilating the ironies of his **In Defence of Poetry**, especially the long, concluding paragraph (in the **Harvard Classics** edition) of that work.