

Music and scientific creativity

This paper by Lyndon H. LaRouche, Jr. was presented on his behalf at the conferences releasing the Schiller Institute's "music manual" in Italy.

One who were familiar with the implications of my 1948-1952 discoveries in the science of physical economy, should recognize why I was impelled to initiate the production of this Manual, more than a dozen years ago. Anyone who recognizes that connection which I uncovered, between physical science and Classical art-forms, would gain a richer insight into the principles of music itself. That connection is the subject of the remarks I submit for today's occasion.

The relevant points to be considered are chiefly the following.

Any study of the current best data, since prehistoric times, on the growth, productive power, and demographic characteristics of the human population, shows us the practical implications of the famous *Genesis* 1: 26-30. Were man another animal, the living human population of this planet would never have exceeded several millions short-lived, brutish individuals, even down to the present day. Unlike every animal, each human individual has the potential for the kinds of valid, creative discoveries which we associate with the most profound achievements in art and natural science. This creative potential of the newborn human individual, is the source of the growth of the human population, of the increase of life-expectancy, of the lowering of rates of infant mortality, and of that increase in the productive of labor on which the improved well-being of mankind depends.

My specialty, a branch of physical science founded by Gottfried Leibniz, is the field of inquiry which addresses the efficient connection between the fostering of individual human creativity and increase of the productive powers of labor. For the period of nearly fifty years, since I adopted that vocation, the center of my work has been to show the specific incompetence of all currently accepted doctrines of political-economy. The essential core of that incompetence, is the use of formal-mathematical and related methods, which exclude consideration of the functional relationship between the fostering of scientific and artistic creativity, and the improvement of the size, productive power, and demographic characteristics of the nations' populations.

From the outset of my investigations, during the 1948-1952 interval, I have concentrated upon the identity of the nature of creativity as we encounter it in the form of valid revolutionary discovery of physical principle, and also in the

form of metaphor in Classical forms of poetry, drama, and music.

As a result of this choice of vocation, there are certain evidences from my experience of life in general, to which I have assigned crucial importance. For example: In my association with some leading scientists, and my knowledge of other cases, I observed carefully the general rule, that every outstanding, creative professional was either an amateur Classical musician, or was knowledgably involved in such musical life in other ways. For me, as a result of my investigations into such matters, the reason for that general rule was no mystery.

Consider, a few key facts concerning the history underlying the emergence of the forms of motivic thorough-composition associated with Wolfgang Mozart, Ludwig van Beethoven, and Johannes Brahms. Examine that body of evidence in the context of the influence of the work of Johann Sebastian Bach, and also his sons, upon the musical education and inspiration of Josef Haydn, of Mozart, and all the leading Classical composers who came after them. Examine the interconnection between the two general classes of discoveries which made possible the compositional achievements of a Mozart, Beethoven, or Brahms.

Compare these two classes with the nature of valid, revolutionary discoveries of principle in natural science.

Volume I of the Manual, placed before you today, focuses chiefly on the first class of such musical-scientific discoveries. This first class of discoveries addresses that potential for singing of poetry, the which is a built-in feature of the functional design of the human speaking apparatus. This addresses those features of that design which are common to the individual, and, in addition, those features which come into view as polyphony is considered. This class of inquiry defines such functional notions of human musical potential as those potentials may be brought forth less imperfectly through training and related discipline.

Thus, the progress of music has occurred in exactly the same way as mankind has succeeded in exploring the physical universe to the effect of increasing mankind's dominion within that universe. This is the standpoint from which the content of Volume I was composed.

The second class of discoveries, which is touched upon in Volume I, will be the subsuming feature of the future Vol-

ume II. These pertain to the principles of Classical composition. Not only are the axiomatics of Classical musical composition identical with the underlying, valid revolutionary discoveries of physical principle in science; perhaps the best way to understand those axiomatics of composition is to examine them from the standpoint of comparison offered by science.

Hypothesis and composition

The standard reference which I have employed for the axiomatics of valid scientific discovery, is the 1854 habilitation dissertation of Bernhard Riemann, "On the Hypotheses Which Underlie Geometry."¹ Once the gist of Riemann's argument is grasped, specialists in musical composition, or Classical poetry, will readily recognize the applicability of the same principles, for the description of the principle of metaphor in Classical forms of strophic poetry, and in Classical motivic through-composition.

The outstanding obstacle to progress in formal mathematical physics, has been the naive assumption, that that simplistic idea of space and time associated with secondary-classroom geometry, is the nature of the organization of physical space-time in the world which exists outside our sense-impressions. That naive opinion fosters the conceit, that space is perfectly extended in a linear way, with uninterrupted continuity, in three senses of direction: back-forward, side-to-side, and up-down. It is presumed, similarly, that time is extended, in the same way, in the sense of past-future. This crude, so-called Galileo, "Cartesian," or "algebraic" notion of space-time, serves poorly educated opinion, as a kind of sausage-casing, into which all physical experience is stuffed. Virtually all commonly taught, and popular opinion about cause-and-effect in physics (and history), are based upon that mistaken, "sausage casing" view of the universe.

Once we recognize the absurdity inhering in that algebraic misconception of the universe, we are led back to the notions of hypothesis employed by Plato. Then, we must recognize that our opinions are the results of our attempts to define the kinds of propositions which are not inconsistent with a certain set of our underlying beliefs. These are our beliefs concerning the way in which we presume that the universe is organized. In textbook geometry, these underlying beliefs are called *axioms*, *postulates*, and *definitions*. Any such set of axioms and postulates, or the equivalent, is identified by Plato as an *hypothesis*.

Another term for hypothesis is "theorem-lattice." Any proposition which is not inconsistent with the axioms and

postulates of a relevant hypothesis, qualifies as a theorem of that hypothesis. Thus, any consistent mathematics, or any consistent mathematical physics, represents a "theorem-lattice": An open-ended collection of all of the propositions which qualify as theorems of the corresponding hypothesis.

In that light, consider the crucial type of case, in which experimental physics shows us the undeniable existence of a physical principle which can not be reconciled with a presently accepted hypothesis. This paradox shows us, that there is an error embedded among the axioms and postulates of the existing hypothesis. The solution to such a paradox, is found in the discovery of a relatively valid, new physical principle.

The needed correction gives us a new hypothesis, entirely replacing the old one. We have, then, a new theorem-lattice, of which no theorem is consistent with the superseded theorem-lattice. This inconsistency between two hypotheses, is recognized in the form of a logical, mathematical, or mathematical-physical *discontinuity*. Relative to the hypothesis which must be superseded, that discontinuity is *absolute*; the gap between the two hypotheses can not be bridged by any attempted extension of the first hypotheses. One can not "slide through" the logical gap represented by the occurrence of the discontinuity.

In Classical forms of poetry and drama, such a discontinuity is recognized as a *metaphor*. In musical composition, a metaphor is expressed in such typical guise as a relative dissonance requiring resolution. In music, the theorem-lattice appears in such typical guises as keys, modes, and higher expressions of modality, such as those characteristic of the late string quartets of Beethoven.

The transitions from one hypothesis to a higher one, whether in science or art, are each and all expressions of the quality in which man manifests the principle of *Genesis* 1:26-30: the individual person qualified by an innate power of creativity which defines man as made in the image of God, and thus afforded the power of dominion within the universe. In the science of physical economy, we demonstrate, that this creative power, when properly expressed, is a power by which the human will may command the universe to obey, a demonstration that the universe is predesigned to obey the creative potential with which man is endowed. In Classical art, this same creative potential, expressed as metaphor, is itself the subject matter.

Those who recall the joyous experience of reliving a valid axiomatic-revolutionary scientific discovery, recognize that special quality of emotion which Plato associates with love of justice and love of truth, with love of God and of mankind. In Plato's Greek, one speaks of *agapē*. The sense of beauty which we associate with great works of Classical art, whether in the plastic or non-plastic modes, is that same powerful emotion, that powerful sense of truth and beauty. In the music of Bach, Mozart, Beethoven, and Brahms, and those like them, the power of this quality of emotion is at its strongest, if the performers are able to deliver the composer's intention.

Thus, for the creative scientist, and for many others, great

1. *Über die Hypothesen, welche der Geometrie zu Grunde liegen*, in *Riemanns gesammelte mathematische Werke*, H. Weber, ed.: reprint of Stuttgart: Verlag B.G. Teubner, 1902 (Vaduz/Liechtenstein: Saendig Reprint Verlag Hans R. Wohlwend). This use of the term "hypothesis" is identical with that of Plato's dialogues, and has no resemblance to the misuse of the same term by Isaac Newton and his followers.

Classical musical composition serves as a hallowed spiritual retreat from confusion, into the domain of the most concentrated sense of truth and beauty, from which we reemerge always strengthened in our powers to exert that quality of creative reason by means of which *Genesis* 1:26-30 sets mankind apart from all other creatures in this universe. Thus, virtually all truly great scientists must rely upon such music, that their moral character might be more fully developed in keeping with their vocation.

Truth in science and art

To understand the true principle of Classical composition in poetry, drama, and music, we must address that same principle of scientific truth, which is ignored in most university science education today.

In that poor quality of scientific education which is commonplace in the world's universities today, the credulous student is informed that it is the "repeatability" of an experimental result which constitutes the standard of truth in science. On the contrary, the proper standard of truth in scientific work focuses our attention upon that principle of hypothesis familiar to us from Plato, Nicolaus of Cusa, Kepler, Leibniz, and Riemann, among others. How do we know, that one method of generating hypotheses is better than another? The answer is not to be found in passive contemplation of experimental or other evidence, but only in man himself.

Riemann's method of hypothesis measures human scientific and related progress by means of the supercession of previously established scientific hypothesis by some valid, axiomatically revolutionary discovery of principle. Riemann's method defines the succession of previous such valid discoveries of principle by science, as progress from a physical space-time of "*n* dimensions," and treats the newly added, valid principle, as determining a higher cardinality of physical space-time, of "*n*+1 dimensions."

This transition from *n* to *n*+1 dimensions, must correlate with a measurable increase in mankind's potential relative population-density, on the condition, that the individual standard of living, and demographic characteristics of the whole population, are improved, too. In the light of the science of physical economy, man serves thus as the measure of scientific truth: the truth of that ordering principle of discovery, the which leads us through an indefinite series of valid discoveries of principle, of the Riemann form of $(n+1)/n$, as this is demonstrated by the resulting increase of mankind's potential relative population-density.

In Plato, the ordering principle corresponding to the generation of such a series of valid hypotheses, is termed *higher hypothesis*. The subject-matter of scientific epistemology is thus defined as Plato's notion of *hypothesizing the higher hypothesis*. Not merely is man's successful increase of mankind's dominion in the universe, the only measure of truth; the comprehension of such truth flows only from attention to the notion of hypothesizing the higher hypothesis. This



Statue of Johann Sebastian Bach in Leipzig, Germany, at the St. Thomas Church. Bach began the scientific-musical revolution.

Platonic standpoint provides us the knowledgable basis for understanding the principles of composition underlying all Classical forms of plastic and non-plastic art.

To understand the greatest works of music in this light, consider the principle we have just identified as it is presented to us by Classical tragedy, such as that of Aeschylus, or of Giuseppe Verdi's favorite dramatists, William Shakespeare, and Friedrich Schiller. Thus, before concluding this report with reference to the Classical Idea in music, consider briefly the exemplary cases of Aeschylus' *Prometheus Bound* and Shakespeare's *Hamlet*.

The tragic figure of *Prometheus Bound* is not Prometheus, but the pagan god, Zeus. The theme is the predetermined doom of the unjust rule of the world by the false gods of Olympos. Like the doomed Zeus of *Prometheus Bound*, Shakespeare's "Hamlet" is a murderous bravo who lacks the courage to abandon those habits of thought which foredoom him. His downfall is assured by his fear of venturing into those unfamiliar axioms of behavior by means of which he could escape that doom. In all such cases, it is the tragic person's failure to solve the dooming paradox of a familiar hypothesis, by rising to a valid new hypothesis,

which is the subject of the drama, as it is the principal subject of scientific progress. It is the essential nature of Classical art, that it addresses this principle of scientific discovery in a special way; the subject of all valid Classical art is that creative process of mind by which man is set apart from and above the beasts.

In Classical musical composition, which is the unfolding development of the polyphonic singing of poetry, the principle of creativity is presented in its most concentrated expression. In the instance of that form of motivic thorough-composition which Wolfgang Mozart discovered through reworking the relevant compositions of J.S. Bach, this principle of Classical musical composition, as developed by Mozart, Beethoven, Brahms, et al., has been brought to its highest relative degree of concentration.

If one wishes to become an accomplished scientific discoverer, such music is the most efficient rehearsal of one's relevant creative potentialities of mind. If one desires no more than to achieve the solace of truthful beauty within the experience of one's own mind, such music is the instrument by aid of which to bring one's mind, again and again, into such a state of happiness. Of such music, man must never be deprived. From those discovered principles of both vocalization and mind, on which the production of such truthful beauty depends, let us never depart.



LaRouche Campaign Is On the Internet!

Lyndon LaRouche's Democratic presidential primary campaign has established a World Wide Web site on the Internet. The "home page" brings you recent policy statements by the candidate as well as a brief biographical resumé.

TO REACH the LaRouche page on the Internet:

<http://www.clark.net/larouche/welcome.html>

TO REACH the campaign by electronic mail:

larouche@clark.net

Paid for by Committee to Reverse the Accelerating Global Economic and Strategic Crisis: A LaRouche Exploratory Committee.

I hope this text will change the music world

by Arturo Sacchetti

Maestro Arturo Sacchetti is an organist, conductor, organ teacher, and the former artistic director of Radio Vatican.

The aim of this conference is the release of this manual. This is certainly an event, at least for those who are familiar with the facts of music, although deep scientific and physical-acoustical implications are also at play here. The book tells the story of the development of tuning over the centuries. It is difficult to orient oneself in this chaos, in which precious original historical instruments have been cut in a certain way. The problem emerged when this implement called the tuning fork did not even exist yet. We do not know how they tuned then. Yet there was certainly a criterion—the relationship between the human voice and the instruments, these machines, these tools of music. There was therefore a basis for establishing what the *Manual on Tuning* calls a "scientific tuning," based on the part of music which is alive, which is what really counts. Because there is a distinction between the scientific aspect and the living practice of music. So we may discern a clear distinction between those who do research, and take these sorts of problems seriously, and the practicing musicians who are not concerned with this dimension.

In order to attempt to bring some order into the chaos of different tunings, some people have worked very hard, first of all to make some historical facts known, and then to demonstrate that these facts are not philological discourses abstracted from the reality of music. This is a very serious matter, since it has a direct physical effect on anyone who sings.

I wrote a brief introduction to the Italian text, which concerns the illustration chosen for the cover. Verdi is relevant, in the sense that in Italy this man still convinces people who understand music. I will read my introduction, to make the reasons for this conference clear.

A lost war?

"'A lost war?' Maybe someone may so characterize the initiative to lower tuning launched in recent years. An uncontrolled folly has taken over the music world, not only in Italy (for once!), but internationally. Those who actively practice music, particularly on the vocal front, have felt on